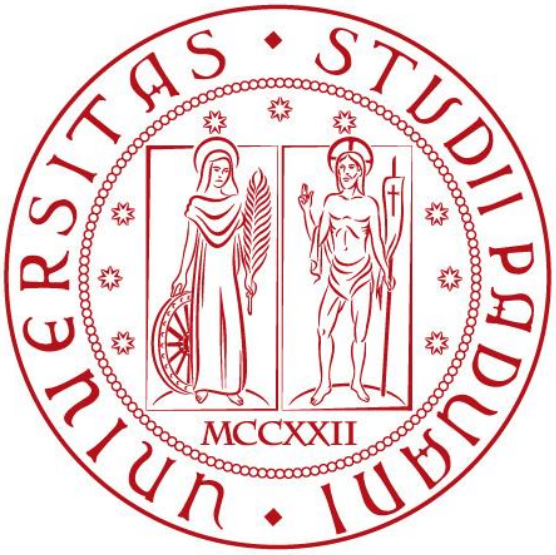

UNIVERSITÀ DEGLI STUDI DI PADOVA

DIPARTIMENTO DI INGEGNERIA INDUSTRIALE

TESI DI LAUREA MAGISTRALE

Standardization and Communication Management

in a multinational company

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Abstract

In the new competitive business economy, project management has become a fundamental way for undertaking several of the business and productivity activities.

Many research and studies in this field state that one of the increasing and most significant concerns and problems with projects is that, projects are behind schedule, over budget and show unsatisfactory performance in terms of quality, specifications and customer satisfaction. This is more enhanced by the global market competiveness, by the fast technological innovations always better developed and by the need of firms to maintain and increase the mainstream customers winning the attempts of other competitors to overtake them.

The thesis intends to show which are the main roots for project failing in this moment. After a brief overview of the project management pillars and methods used by the main part of multinationals around the globe, it focuses on some of them that could be improved inside this company doing certain activities toward this scope. In this specific case, we have realized that there are big opportunities for improvement mostly in the way through people communicate when they work inside a project.

Practically, we understood that team members could work easily and more efficiently if they used the same IT communication systems and share places where to store documents. Secondly, if they are really clear in their mind how to store, organize and find data in a fixed projects' directory structure. These two points are obviously valid from the point of view of local enterprises, where there are different departments with cross-functional teams, but are becoming absolutely needful for international environments, where the projects have bigger sizes, longer times and more important scopes, and where teams are composed of people of different cultures, work traditions and approaches.

Furthermore, it is well recognized that communication in general is one of the main keys to successful project management, both regarding the relationships among team members, but also to keep engaged and informed figures such as stakeholders, sponsors, suppliers, customers and so on.

The qualitative data for the activities was collected working with several departments and key users among either the local company or the global Group, under the supervision of the Project Manager of Baxi S.P.A. in Bassano.

The results of the study reveal that all users have appreciated and promoted the improvement proposed, showing how relevant to project management are agreements about standardization and improvements regarding the processes of communication in a company, where the work is always seen as team work rather than a single and functional endeavor, stimulating further discussions about future opportunities for improvements in other areas and departments.
All this can also be seen as a way to enhance the value and efficiency of work with the principles of lean management, which adopts tools and techniques to eliminate waste and to standardize as ways to improve processes and operations inside companies of every size.
These activities were done in a period of five month inside the Research and Development Centre of Baxi S.P.A. in Bassano del Grappa.

Keywords: Communication Management, IT Systems Management, Project Management, Standardization, Lean Management.

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Last but not the least, I would like to thank my family: my parents and to my brothers and sister for supporting me spiritually throughout writing this thesis and my university life in general. I want to dedicate the result to my father and mother, that supported me in every difficult moment of my university career and I can sincerely say that without their continuous encouragement probably I wouldn't have achieved this goal.

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1. Introduction

1.1 The importance of Projects Management nowadays

In the last years of intense and growing international competition, companies have understood that project management is an imperative to pursue successful targets, in every business field and for every kind of product or service provided. Many industries such as services, construction, administration, management, product development during their existences have seen the central way taken by project management in their strategic plans, addressing an increasing value to the role of project manager and the activities of project planning, organization and monitoring, in order to maintain their presence in existing markets and to satisfied the always more precise customers demands, needs or expectations in terms of quality and technological rate.

With the growth of competitors and technologies, firms have had to reduce the likelihood of failures, defects and problems in their products and services, moreover they were obliged to highly decrease the costs and time to market in their processes due to the possibility to see their existences ruined by other more efficient and effective international organizations.

After having briefly understood the global market situation, we must understand what is it the project management and which are the benefits carried out with its use.

As definitions, we consider the two well know methods used by the biggest international firms all over the world:

- "Project management is the planning, delegating, monitoring and control of all the project's aspects, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks" (PRINCE 2).
- "Project management is the application of knowledge, skills, tools and techniques to meet project requirements. This includes: identifying requirements, defining clear and achievable objectives, balancing the competing demands for scope, cost, quality and timing, adapting the approach to the concerns and expectations of the various stakeholders", (PMI).

The benefits of project management are many and of different sorts, hence we have collected a list of the main advantages for companies that have successfully implemented it in their business:

- increased productivity

- increase in quality
- encourage consistent communications among staff, suppliers and stakeholders
- keep costs, timeframes and resources to budget
- improved customer satisfaction
- increased risk assessment
- greater competitive edge and standing
- better efficiency and enhanced efficacy in delivering services
- chance to expand your services
- improved development and growth within your team
- better flexibility

Many global executives recognized that the implementation of project management as a core proficiency has helped their organizations to remain productive and competitive during the recession, discovering how efficiently the methods and strategies decreased risks, cut costs and enhanced success rates in their projects. Furthermore, now they consider a strong and solid project management discipline as a top-three priority for both local and international companies as they look to the future, because the success of projects realizes the delivery of business outcomes and this drives to the growth or recession of the firms.

1.2. Main roots for the failure of projects

Although there are many resources, best practices, methods and guidelines regarding project management, many organizations have been losing their positions in market seeing their incomes raise down due to the projects' failures.

During last decade many researches were done around this issue to discover how often firms are facing troubles due to unsuccessful projects, and one study of a leading Consulting Group affirmed that:

- About 23% of projects were successful;
- About 53% were completed but went beyond time and/or budget;
- About 24% were aborted and unprofitable.

Moreover, that analysis found a direct correlation between the team size, project duration and high failure rate, finding that projects failures increase with team size and project duration.

Many projects are not delivered on time and that means a delay in production and introduction, missing market opportunity and the first position in technologies. Many others overrun cost reducing the net income, and finally others don't meet the customer expectations or haven't got high levels of quality and performance: the obvious result is that factory's superiority will be overtook, incomes will decrease and the future could be threatened by competitors.

Seen this issue, it sounds logic to analyse the main causes of project failures, finding a list of problems faced by companies in the last years in the development of their projects. These are the more frequent deficiencies registered in the recent literature that cause unsatisfactory projects:

- low or lack of project management culture and maturity;
- Unclear scope and requirements;
- Information doesn't flow properly;
- Lack of communication at any level;
- Missing or misunderstood methods, processes and planning;
- Organization not adapted to the project;
- Missing or not adapted tools;
- Missing prioritization of requirements by stakeholders;
- Unclear roles and responsibilities;
- Lack of quality with poor estimation of duration and cost;
- Lack of a valid business case to justify the project.

We can see that there are many possible causes and of completely different sorts, so the new perspective of project management must be to fill every void regarding tools, documents, methods and processes as well as to apply better the principles of management, communication and collaboration between people.

1.3. Aims and objectives of the study

The target of this thesis is to explore the opportunities and suitable solutions to make improvements in the areas of communication tools and information management during the entire project and the standardization of directories structure and activities' templates used by international teams during the development of projects.

These activities allowed me to gain a bit more understanding of the role assumed by a project manager in an international and multicultural environment, where every decision or action has to

follow a complex process of evaluations and agreements with many people involved, resulting in the achievement of same targets in a team vision rather than of a single person.

1.4. Overall thesis structure and process of the research

The thesis covers main pillars of the project management focusing on communication management and standardization. After the introductive part, where it is described the general framing of the global situation in the first chapter, there is the company overview in the second one. In chapter three it is discussed and shown the project management, with a brief focus on its history and roots, sliding to the one of the most used method for project management that it was also used by the Group BDR Thermea to build its suited “Stage-Gates” model, tailored to the sort of projects that are usually developed in its establishments.

In the fourth chapter is covered the first activity done in the plant of Baxi S.P.A. in Bassano that shows how communication can be manage and improved reducing the number of software used. It was accomplished with an analytical process started with the Voice of Customer, followed by an objective benchmark of the tools and finished with a list of best practices and the implementation of a new advanced software for social communication in the work environment.

Finally, last and more important activity is described in chapter fifth, activity that involved many key users of the entire Group BDR Thermea requiring a precise succession of steps to reach the final result. It consisted in the standardization of projects’ folders root for all the Research & Development Competence Centres in the whole Group. The target was to increments interactions and cooperation amongst different departments (both local and of the Group) involved in the same projects and activities, building a share space where all team members are able to work together avoiding data dispersion or duplication and saving time in data research, focusing on the importance of the document for the team-work and project evolution. The result was a great reduction in the number of directories as well as the number of activities’ templates, all that with the possibility to be implemented in a shared software ranked in the first positions in the analysis considered in the chapter four.

2 Company description

2.1 Baxi S.P.A in Bassano

Baxi is a part of BDR Thermea, one of Europe's largest manufacturers and distributors of domestic and commercial water and space heating systems. Its investment is based on boiler products and renewable technologies, including solar thermal hot water systems, ground source heat pumps, air source heat pumps, biomass boilers and micro combined heat and power with Baxi-Innotech.

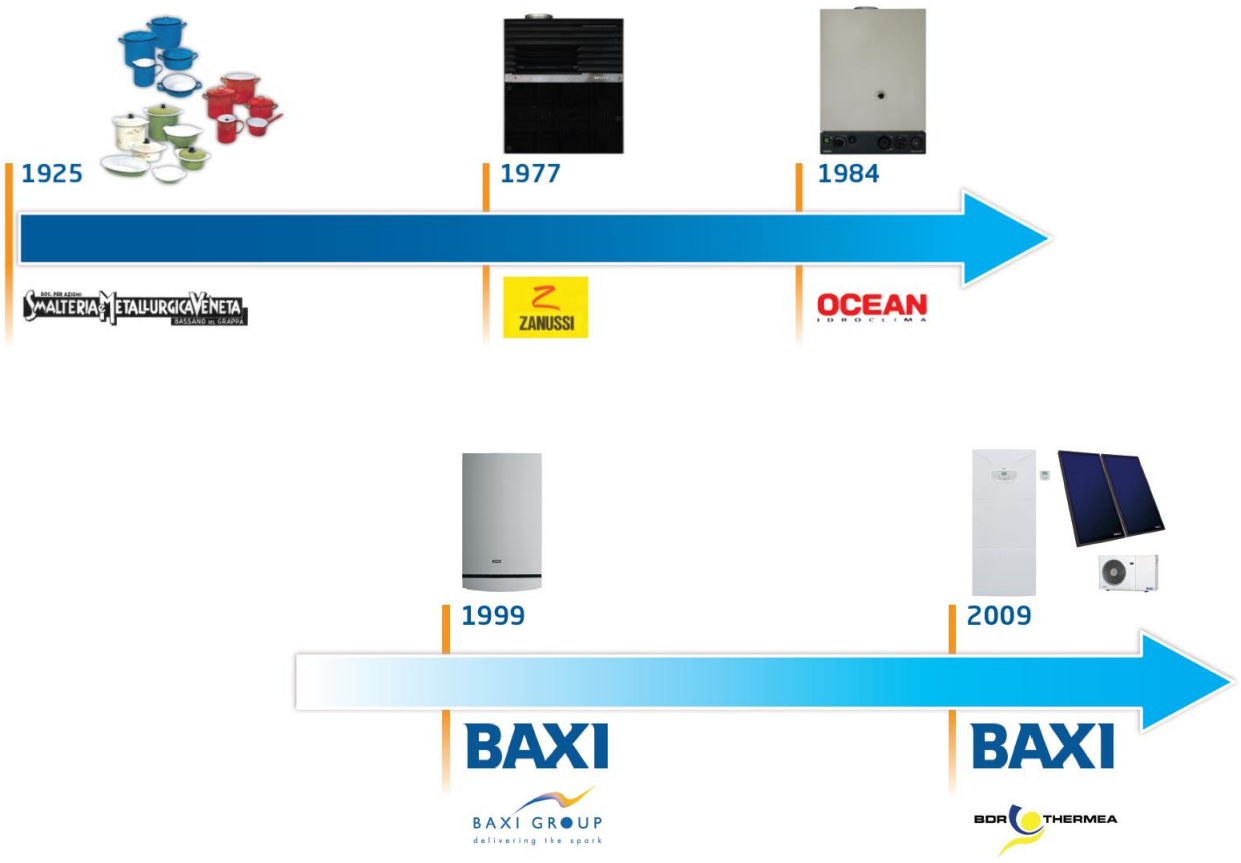
Baxi Italy is a company that dates its roots back in 1925 when the Austrian family Westen established Smalterie Metallurgiche Venete plant, one of the biggest plant for the production of enamelled products as electric water-heaters, bathtubs and steel radiators. By the end of the 70's, the company focused its production on heating sector becoming one of the first plants to introduce gas domestic products with the production of wall-hung boilers at the same time with

gas network development. By mid 80's, the company keep performing brilliant results consolidating its presence on the domestic area; then the expansion toward foreign markets started.

In 1999 entered the Baxi Group, European leader in heating sector, and in 2002 was formed Baxi International, a division of the Baxi Group, to manage the group's international sales, marketing and after-sales activities in more than 70 countries across the world.

Finally in 2009 De Dietrich Remeha Group and Baxi Group announced the creation of BDR Thermea.

For over 35 years, Baxi has been designing and producing wall-hung and floor standing boilers in the biggest European plant of the sector. More than 8 million of boilers produced, as a proof of the reliability and the quality of its wide range. A complete set of energy efficient heating systems, which guarantees the maximum comfort and savings, and which has evolved through years from a single product to an integrated systems range with renewable energies.



With More than 30 years of know-how in gas boilers, Baxi has always count on an in-house Research and Development Department: more than 10 million euro invested in last years, allowing

Baxi to be recognized as an “excellence center” in designing wall hung boilers for the BDR Thermea Group.

Baxi plant based in Bassano del Grappa, with its 100.000 square meters of surface, is the largest European plant of the heating sector, including 13 production lines (which guarantee a daily production up to 4.000 boilers), warehouses (for row materials, end products, spare parts), and a wide area dedicated to the logistic management (each day about 30 trucks cross the threshold of this plant to deliver Baxi boilers over Italy and more than 50 countries worldwide). An innovative factory, always searching for continuous improvements, as the Lean Production and Zero Defect projects can prove.

In the factory based in Bassano del Grappa, about 750 people are committed to their daily activities sharing a common goal, thinking of new solutions, developing new ideas, producing and delivering products that satisfy the requirements of market and customers.

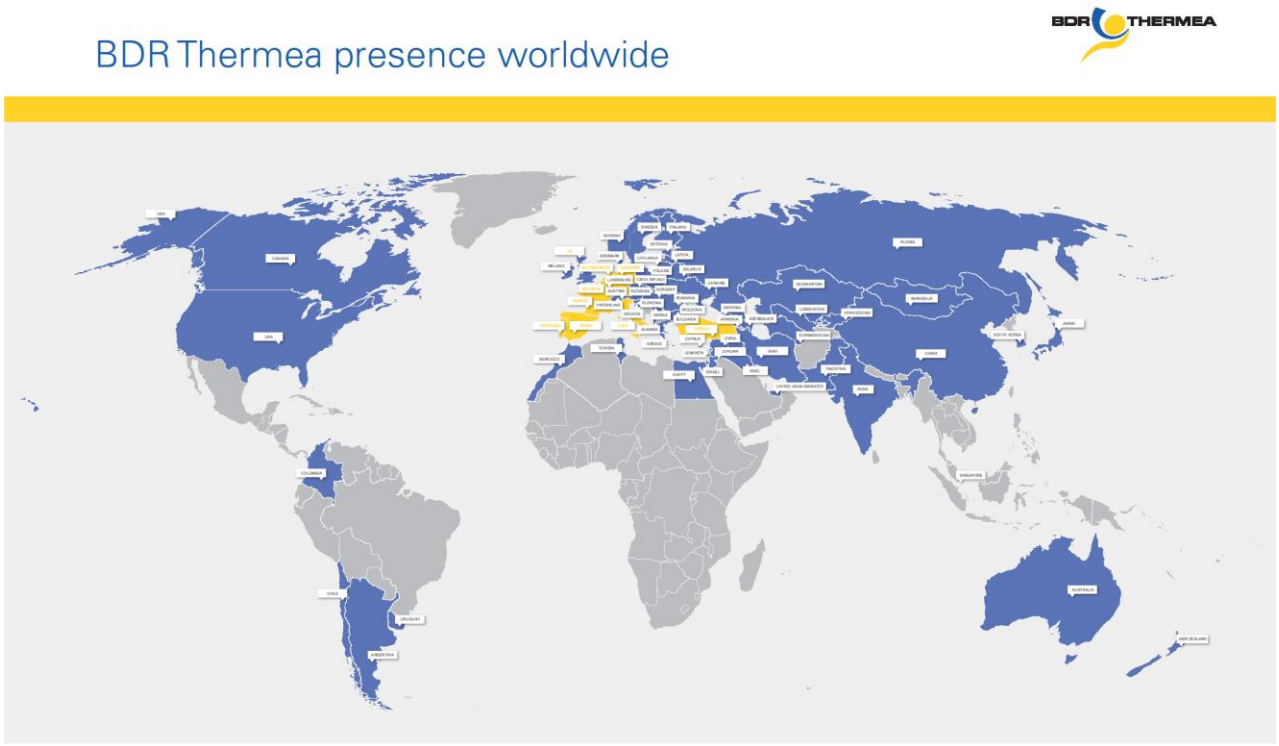
Besides providing a wide range of boilers and high efficiency systems up to 650 kW, Baxi aims to take on the current and future challenges improving its services addressed to distributors, installers, design engineers, service centers. Indeed it provides continuous technical and training activities at the Baxi L@b Training Center, well-equipped to satisfy all the new requests in terms of training, the technical specifications software are always available on the web site, there are customer services as the technical Call Center, the “Baxi Più” extension of warranty program, and thanks to an efficient management of the spare parts supply, Baxi is able to guarantee to its commercial partners a professional and quick after-sale support.

Baxi is committed to satisfy its customers’ requests in compliance with the current laws in terms of Environment, Health and Safety at Work, searching for a continuous improvement. Back in 1993, the company was one of the first player in the heating sector to obtain the ISO 9001 certification, as a proof of the quality that characterizes the company, its processes and its products. In 2001, Baxi gained the ISO 14001 certification for the environmental conservation, and in 2004 the company obtained the OHSAS 18001 certification for the healthcare and the safety protection of its own employees.

2.1. BDR Thermea Group

BDR Thermea is a world leading manufacturer and distributor of sustainable and smart climate and sanitary hot water solutions and services, operating in a market worth over €16 billion of annual sales, and it employs 6,500 people across Europe and have an annual sales close to €1.7

billion. The Group has a top market position in key European countries and strong positions in the rapidly growing markets of Eastern Europe, Turkey, Russia, North America and China: in total BDR Thermea operates in more than 70 countries worldwide.



The Group owns and sells some of the leading brands for heating products in the European market. These include Baxi, De Dietrich, Remeha, Brötje, Chappée and Baymak. Its headquarter is based in Apeldoorn, The Netherlands.

Main history points of the Group:

- 1684 Jean Dietrich purchases the Jaegerthal Forge, the cradle of the Diedrich company in France
- 1866 Richard Baxendale establishes the foundry which becomes Baxi UK
- 1917 Start of Compania Roca Radiatores in Barcellona, Spain
- 1919 Fundation of Brotje in Rastede, Germany
- 1925 Smalterie Metallurgiche Venete by the Western Family in Bassano del Grappa, Italy
- 1935 Establishment Van Reekum's Metaal Handel, Remeha, the Netherlands
- 2000 Creation of Baxi Group through merger of Newmond PLC and Baxi holdings PLC (UK)
- 2002 Baxi Group aquires Europena Fuel Cell, now Baxi Innotech
- 2004 Remeha acquires De Dietrich Thermique

- 2005 Baxi Group acquires Roca Heating (Spain)
- 2009 De Dietrich Remeha Group and Baxi Group form BDR Thermea
- 2011 Major participation in Baymak (Turkey) and increased participation in microgene engine corporation
- 2015 BDR Thermea acquires ECR International, United States

In BDR Thermea there are ongoing efforts toward innovation: they make considerable capital investment in research and development resources, focusing on energy saving and low carbon technologies, aiming to exceed its customers' expectations with innovative products, and to do so it involves its customers and suppliers in its research and design process. They are always working on continuous improvement, reliability and the innovation of components and products to increase quality and make life easier for installers, minimizing the effect on the environment by managing the complete product lifecycle. The strong research and development platform and the financial strength of BDR Thermea provide the opportunity to confirm and build on its leadership in the heating industry. In addition to manufacturing high efficiency boilers, it is committed to developing new heating, cooling, energy and air solutions that can play a major role in tackling climate change. Considerable investment in an international network of Centres of Excellence across Europe helps the Group to stay at the cutting edge of innovation across all technologies.

This means that, as well as enhancing the heating systems of today, it is developing solutions to meet the sustainable, economic and legislative requirements for future generations.

Worldwide, its business is based on the same core values:

- Putting customers first:
    - Providing installers and their customers with the best choice of products in every country and market that we serve.
- Creating a more sustainable future:
    - Meeting and exceeding ErP regulations. Providing solutions that save energy, minimise carbon emissions and reduce energy bills.
- Providing smarter choices:
    - Clever design makes installation and maintenance easy. Intelligent controls save energy and reduce operating costs.
- Delivering real value for money:
    - Offering the most competitive price/performance ratio in every market that it serves.

- Offering integrated solutions:
    - Providing compatible heating, cooling, energy and air solutions that can be used together, in different combinations, maximising energy and cost savings.
    - Service and spare parts:

3. Project Management

3.1. Brief history of Project Management

Methods of project management have been practiced since the Egyptian era, even if companies started only half a century ago applying systematic tools and techniques to manage complex projects. Project management in the modern sense began in the 1950s with the Polaris project of Navy, between 1960s and 1970s Nasa, Department of Defence and other big organizations mostly in the engineering and construction sectors implemented project management methodologies for larger and more complex projects. After that, during the 1980s there was a massive diffusion among manufacturing and software development firms with an increased level of sophistication in tools and techniques used. Almost diffused and known worldwide, by the 1990s a large part of industries from every sector relied on project management tools and principle to develop their products or services. Now we can definitely assure that managing projects of every size, budget and kind is become necessary for all organization, both small and international.

Focusing on the key events in the project management development, we can identify 26 points of improvement starting from the beginning of this method:

- 2570 Beside Christ: The Great Pyramid of Giza Completed;
- 208 Beside Christ: Construction of the Great Wall of China;
- 1917: The Gantt chart Developed by Henry Gantt;
- 1956: The American Association of Cost Engineers Formed;
- 1957: The Critical Path Method (CPM) invented by the DuPont Corporation;
- 1958: The Program Evaluation and Review Technique (PERT) invented for the U.S. Navy's Polaris Project;
- 1962: United States Department of Defense Mandate the Work Breakdown Structure (WBS) Approach;
- 1965: The International Project Management Association Founded;
- 1969: Project Management Institute (PMI) launched to promote the Project Management profession;
- 1975: PROMPTII method created by Simpact Systems Limited;
- 1975: The Mythical Man-Month: essays on software engineering by Fred Brooks;

- 1984: Theory of Constraints (TOC) introduced by Dr. Eliyahu M. Goldratt;
- 1986 Scrum named as a Project Management style;
- 1987: A guide to the Project Management Body of Knowledge (PMBOK Guide) published by Project Management Institute (PMI);
- 1989: Earned Value Management (EVM) leadership elevated to undersecretary of Defense for Acquisition;
- 1989: PRINCE method developed from PROMPT II;
- 1994: CHAOS report first published;
- 1996: PRINCE2 published by Central Computer and Telecommunications Agency;
- 1997: Critical Chain Project Management (CCPM) invented;
- 1998: PMBOK becomes a standard;
- 2001: The Agile Manifesto written;
- 2006: Total Cost Management Framework release by the Association for the Advancement of Cost Engineering (AACE International);
- 2008: 4th Edition of PMBOK Guide released;
- 2009: Major PRINCE2 revision by Office of Government Commerce (OGC);
- 2012: ISO 21500:2012 Standard for Project Management released;
- 2012: 5th Edition of PMBOK Guide released.

Although in the past there were great and successful projects such as the great Pyramid of Giza, The Great Wall ofChina and the Coliseum, literature documentation and information about them are scarce or incomplete. On the first hand, this could be addressed to the fact that in the past what mattered were the final results of the projects rather than the processes or methodologies to reach the target. Secondly, the chiefs accountable for the projects were often not instructed and so there wasn't an interested to share their techniques and paths to deliver a good work. Another possibility is the secrecy of the know-how in managing projects among different families or groups, reserving that as treasure to transmit from one generation to another.

Several authors made big efforts to create a chronologic succession in the history and evolution of project management, finding an agreed division in four macro-periods:

- 1) Prior to 1958: Craft system to human relations. Fixing the origins of modern project management between 1900s and 1950s, in this first period the evolution of technology such as better transportation and telecommunication improved the speed of mobility and communication. Tools and techniques were been developed, such as Gantt charts and the

Work Breakdown Structure and grew the concept of job specification, that is the set of knowledge, abilities and skills needed to perform a job efficiently. One of the icon projects of this period is The Manhattan Project in 1942.

- 2) 1958-1979: Application of Management Science. There were noticeable technology advancements such as the first plain paper copier by Xerox, innovative tools for project management for instance Critical Path Method or Program Evaluation and Review Technique, the compulsory use of the Work Breakdown Structure with a certain size or scope. With the development of mini-computers and their subsequent rapid improvement, emerged many project management software's firms introducing also other advanced tools for example the Material Requirements Planning.

  Was created the first project management association called International Project Management Association and a bit later the Project Management Institute, which the willingness to promote and diffuse the tools and methodologies around the world. Symbol projects were the Polaris missile in 1956 or Apollo in 1960.

- 3) 1980-1994: Production Centre Human Resources. The main revolution in this era regards the development of personal computers that changed the information management sector. With these low-cost, multitasking and efficiency PCs, there were an increment of software capable to deal and manage big sets of data or information needed to the projects, chancing the manners of work and business inside organizations. Consequently, there was also an jump in the project management programs, with lower costs and hence at more affordable prices for the industries

  In these years was created the PROMPT II model (Projects Resource Organization Management Planning Technique II) that later became the PRINCE model (Projects in Controlled Environment) so every kind of industries could follow a set of strategies and best practices to develop the projects.

  Another leap forward was the management philosophy of the Theory of Constraint focused on the fact that the reaching of a target is limited by at least one constraint. At the same time, new tendencies such as the flexible scrum approach emerged, thwarting to move the importance from a single person task to a teamwork with a common objective, mostly in the software sector.

  Following the trend of PRINCE, also the Project Management Institute published its guide called PMBOK that wanted to become a global standard for the organization with a review

and translation in a single place of the best accepted project management practice and techniques.

- 1995 to present: Creating a New Environment. It is the era of Internet, which revolutionized almost everything in businesses: fast communications, new ways of purchasing, innovative services and new tools led people to a completely different set of opportunity to live and to work together. That influenced also project management, with the development of software and tool to work and interact globally with more control, organization, speed and efficiency: started the work at a remote site.

  In addition, there was also a development in the techniques: PRINCE evolved to PRINCE 2, was emitted the Critical Chain Project Management (CCPM) to plan and manage projects from an overall point of view, in 1998 PMBOK was fixed as a standard, finally in 2001 was drafted the Agile Manifesto targeted to improve the performance of teams inside the projects

In the last years, organizations are facing a high exposure to the principle of Total Cost Management (TCM) method to manage cost in the entire life cycle of enterprise, project, program, facility, product or services. It is also focused on the scope of a project, governing the cost, and it is based on the Plan-Do-Check-Access (PDMA) model: with these iterative overtures to reach and fix repeatable processes. Parallel to the fourth revision of PMBOK in 2008, organizations became to implement the idea of Software as a Service using Cloud services (Storage as a Service) and tools to reduce fixed cost and to take advantages of less investment and concerns about installation, maintenance or updating.

Whit it ongoing development, in 2009 project management was classified as the third more valuable skills, addressing for the first time a clear and fully recognized importance for the role of project manager in every field considered. Whit this recognition, started the professional courses and academies to prepare and support high-level project managers, there was a review of PRINCE 2 with the introduction of two books: Managing Successful Project with PRINCE 2 (built to be a guide for project manager) and Directing Successful Project with PRINCE 2 (created for directors or sponsors). This increase of the recognizable importance of project management and with the evolution in the communication technology, software and tools, allowed the development of a new way of work: the virtual worker. More employees started working at home or in separate places creating new interaction manners and pointing out increasingly the key role and challenge of an effective communication.

3.2. PRINCE 2 Project Management method

PRINCE 2 is a leading process based method in the wide field of project management, recognized worldwide as a standard methodology to manage project from the “idea” to the “launch” of the new product or service. It focuses on many areas involved into the project evolution, mostly on business justification, on the division of project in manageable and more controllable stages, on the flexibility, on the team structure and responsibilities, on the product-based planning approach. It derives from the evolution of PROMPT II in PRINCE and then PRINCE 2: the common target has been to address the common causes for project failure providing a set of best practices and guidelines to increase the success rate, the quality and the effectiveness in projects. In 1975 in the UK, the Sympact Systems Limited Corporation created the method PROMPT II to help computers’ industries to complete projects with the control of budgets counted during the feasibility forecasts. It suggested seven stages to complete the project’s path:

- Feasibility study;
- Initial Stage;
- Specification Stage;
- Design Stage;
- Development Stage;
- Installation Stage;
- Operation Stage.

Ten years later in 1989 the UK Government’s Central Computing and Telecommunication Agency determined the standard method in UK with the publication of PRINCE, that introduced new aspects such as control procedures, defined management structures, plans for resourcing and technical problems, deliverables for the product, for the customer and for the project. Moreover, there was a creation of three new and never seen roles that are Business Assurance Coordinator, Technical Assurance Coordinator and User Assurance Coordinator, with the scope of assuring progress in their areas of competency. A drawback of this method was the rigidity and the usability only in large projects. That issue was resolved in 1996 with PRINCE 2 and further improved in 2009 in consultation with international experts and users. The last revision led to a simpler and customizable method, based on these pillars:

- Continued Business Justification;
- Learn From Experience;
- Defined Roles and Responsibilities;

- Manage by Stages;
- Manage by Exception;
- Focus on Products;
- Tailor to Suit Environment.

After this brief description of PRINCE 2 roots and evolution, it is useful to go a bit deeper into its principles and best practices collected in.

Project in Controlled Environment (PRINCE 2), as we said previously, is a structured project management method, both for beginners' personnel and for senior project managers, sponsors or directors. It starts with explaining why the meaning of "project" is so important, and it is due to two main reasons: to sustain current business operations and to transform them in order to survive and compete in the increasingly crowded market. Projects are highly linked with changes.

In the book Managing Successful Projects with PRINCE 2, there is a clear definition or the word project: "A project is a temporary organization that is created for the purpose of delivering one or more business products according to an agreed Business Case". In that meaning, we are able to pick up the main characteristics of a project:

- Change, they are taken to transform or improve something;
- Temporary, there must be a start point and a finish one;
- Cross-functional, this one of the most important features, indeed it engages many people from different functions to create a team capable to develop and go on only with cooperation and sharing, furthermore it involved also people out of the company, for instance customers or suppliers;
- Unique, no one project is completely identical to another one in fact could be change the team, the target, the cost, the product and go on: projects differ from many o few characteristics, but they are never equal;
- Uncertainty, there are always threats and risk that need to be identified and evaluated throughout the project.

Follows that needs a general management and control of all these features and so there must be a project management methodology. "Project management is the planning, delegating, monitoring and control of all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks." It is the control and development of all little steps and activities inside the project that have to be linked and done together to complete the project achieving the final and successful

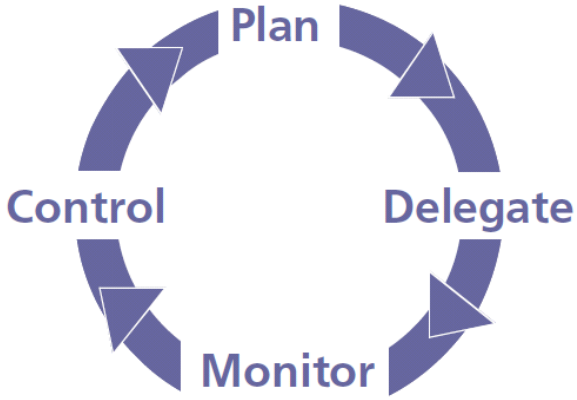
result. There is a reason for its worldwide implementation: the rules are generic and flexible, suitable for organizations of every size, field and culture, and it is able to do that because it avoid to group the project work of specialist employees such as engineering, test or others.

Parallel to the method, it needs to understand the role of project manager, not completely clear for many industries. This figure plans, control and take decision regarding all set of activities inside the whole project, with a big focus on communication and coordination of team members, linking inter-functional resources with the object to deliver the project on time, on budget and on quality forecast and decided in the first steps. He have to make critic decision leading the team whenever something goes wrong or it is dangerous for the project. Moreover, he reports important issues to the general manager or director assuring every time a complete view of the problem and the possible consequences for the continuation of the project.

This kind of work requires a wide set of skill and competencies: communication, time management, people management, conflict management, negotiation, planning, problem solving, attention to detail and so on, hence it is easily understandable how intense and recognizable is becoming his work.

It is worthwhile to analyse also the variables that project management aim to deal with (as well as the project manager does). In every project there are six aspects to cover regarding the project performance have to succeed:

- Cost: the project have to be affordable and the cost need to be administrated;



- Scope: we need to know what the project will deliver, the final result that we work for. It needs to declare at the beginning what is or is not within the scope and the project manager has to control the boundaries of the project to don't exceed in cost, time or product's features;

- Risk: all projects carry risks and it is unavoidable, but they have to be known and calculated, forecasting the possible impact of their occurrence during the project, trying to minimize them and assessing how much risk can be accepted to continue in a safe and successful path;
- Quality: the products or services of the project must satisfied the initial purpose, with the whole set of features required from the customer and sponsor;
- Timescales: the project have to follow the time schedule, respecting the dates, delivering both deliverables and mostly the final result;
- Benefits: the project manager has to have a clear vision of the why the project is been undertaken, what kind of result it aims to deliver, and which are the profits for the organization. Following that, there will be a precise target to achieve and a reason to fulfill the work with a clear path.

As we said two page before, with the last review of PRINCE 2 there was an introduction of key principles that form the bases of this methodology. These pillars are characterized by universality (applicable for every sort of project), self-validation (with proven cases of its practices application) and empowering (they enhance the competence and abilities of people to develop a tailored manner to manage specific projects). Those principles derive from lesson learned of good and bad projects among a long list of case studies, collecting the experiences, suggestion and issues of many organizations and experts.

Principles:

- Continued Business Justification: “A PRINCE 2 project has a continued business justification”. It means that there is a financial reasonable justification to start the project, which remain valid throughout the project and is well documented. This is built, analyzed and repeatedly reviewed through a document called Business Case: this document guides many critical decisions and guarantees a complete alignment among project’s objectives , portfolio management and firm’s business strategies. It is useful also to detect poor project avoiding waste of resources, and a relevant thing is that this justification continues in every stages of the project until the project launch and the project manager and general managers continuously evaluate it.
- Learn from experience: “PRINCE 2 teams learn from previous experiences: lessons are sought, recorded and acted upon throughout the life of the project”. Because every project is unique and different, no precise experiences are available to manage it, and PRINCE 2

suggests to follow some best practices. The team can considers similar projects done in the past to see which issues, strategies and threats there were and how they were handled; during the project it is useful to create and update reports based on lessons learned considering ongoing improvements; at the end should be created a final lesson learned with the object to evaluate the closed project and learning from it, and also to create suggestions for future projects akin that completed.

- Defined roles and responsibilities: “A PRINCE 2 project has defined and agreed roles and responsibilities within an organization structure that engages the business, user and supplier stakeholder interests”. People are the principal part of projects and they need always to know what they have to do, for what they are accountable, which is their position in the project’s management structure. Furthermore, it could be that employees from different departments are involved, and with various amount of priorities and of time available to the project, so the project management team have to be composed by people with agreed roles and accountabilities following the best ways to communicate with each other’s. Example of stakeholders are the Business sponsor, the Users and the Suppliers: their interests have to be satisfied effectively throughout the project, if it doesn’t happen, the outcome won’t be successful.
- Manage by stages: “A PRINCE 2 project is planned, monitored and controlled on a stage by stage basis”. This is a relevant feature because it guarantees a certain level of quality and provide a good way to handle the risk: this approach consist in a series of stages followed by gates where the project is continuously assessed and judged with the help of the Business Case and the plan of activities. Decision to proceed, to stop or to recycle are taken by seniors managers after the evaluation of the project deliverables brought by the project manager and others department’s chiefs. To accomplish this principle, the project must be divided into several stages, with a clear Project Plan and Stage Plan, with strict checks and judgments at the end of each stage (at the gate).
- Manage by exception: “A PRINCE 2 project has defined tolerances for each project objective to establish limits of delegated authority”. It means that there are clear accountabilities for directing, managing and delivering the project from the first level up to the lower ones. Exceptions refer to the changes from the initial forecast and they can affect variables such as time, quality, cost, scope, risk and benefit: every change must be

assessed, controlled and monitored by accountable people of each level, without consulting the senior management for issues that can be resolved at lower levels.

- Focus on products: “A PRINCE 2 project focuses on the definition and delivery of products, in particular their quality requirements”. The scope of a project is to deliver a successful product that satisfied the stakeholders’ requirements: to do this there needs an output-oriented project, providing a complete understanding of the product’s characteristics and peculiarities, comprehending the judgment criteria and the level of quality needed. A useful document is the Product Description that contains all specific information needed to develop a product congruous with the expectations.
- Tailor to suit the project environment: “PRINCE2 is tailored to suit the project’s environment, size, complexity, importance, capability and risk”. Many corporation worldwide have used it successfully, and this happens because it can be tailored to every specific kind of projects: it is universal. Even if it can fit all sorts of project, it need to be customize to the organization, align the method to the organization, considering complexity, scale, risk and importance of the projects that will be undertaken. This step is usually done by the Project Managers and the Project Board with the publication of a final document that counts all processes and decisions: the Project Initiation Documentation.

On these bases, it has been built and tailored the New Product Creation Process (NPCP) used by the entire BDR Thermea Group (and hence by Baxi S.P.A.) and described in the next section.

3.3. Stage-Gate method in BDR Thermea Group

The Group has understood that in today’s business situation it must be able to react to the changes of market needs rapidly, effectively and responsively. This means to reduce the time to market and the flexibility of products. Decisions, activities and improvement must be made quickly and right the first time, and these necessities carried BDR Thermea to bring the way of concurrent engineering either for products or for processes. A NPCP is used when a new product or accessory is required by the business that generates a new top level sales code or a variant which is to be sold into a new market, even though it doesn’t generate a new sales code will also use the NPCP . Instead of a change to specification that does not affect upon the top-level sales code will go through the engineering change process.

Successful NPCP Projects rely on some key factors included also in PRINCE 2:

- Team leadership;
- Appropriate framework and process;
- Decision making;
- Collaboration and cross-functional teamwork;
- Clear roles and responsibilities;
- Risk management;
- Product focus.

The NPCP employs a “Stage Gate” methodology, an input (Idea) is turned into an output or deliverable (Successful Product) by an activity (New Product Creation Process). The periods of activity between stages gates are described as process stages: stages are where activities occur, they are cross-functional and are the ranges of time in which team members accomplish key tasks decided and scheduled on the project plan to gather information needed to proceed in the project toward the next stage gate. Each stage cost more than the preceding one, so that the project plan is based on incremental commitments, when uncertainties decrease in the stages, expenditures car rise and rick is managed. In any stage, the target is to collect important information (technical, financial, market, ecc.) that will be judged at the stage gate by the management board, to decide

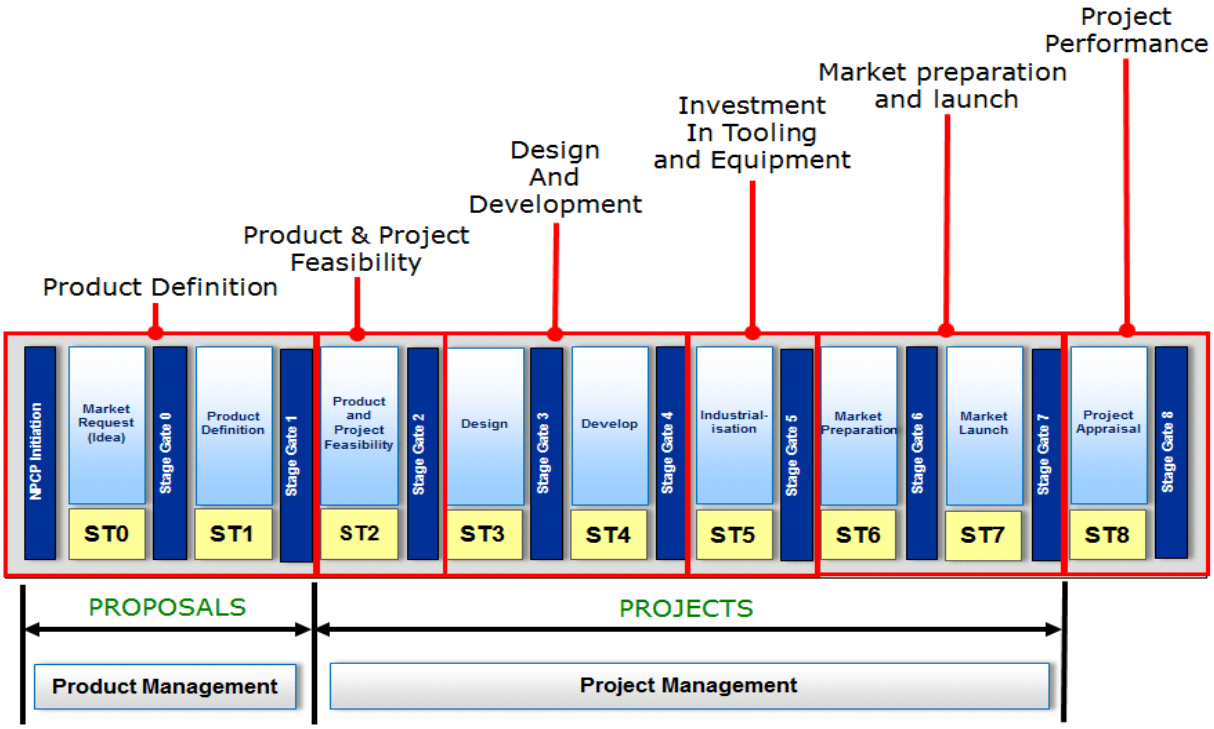
how to advance or not with the project. The decision to progress the project is assessed by a measurement of the quality of the pre-determined stage deliverables against set criteria.

In every stage are produced derivable, that are the inputs into the stage gate review, they are the result of the tasks and activities undertaken during the stage and that drive the decision at the gate. These derivable are specified for each stage as action plan providing a path during the project, and on them the project management board decides if the project can go ahead, must be killed, held or recycled: if the project is allowed to continue, the project team should sign the stage gate approval document to be embedded into the NPCP database.

As we said, deliverables are assessed against a set or criteria pre-determined in the stage gate before or even at the beginning of the whole project: criteria are the comparison parameters and they should contain both financial and qualitative principles changing from gate to gate.

This management process and approach guarantees some benefits. It puts discipline in an otherwise uncoordinated series of events, it focuses attention on quality of execution, it speeds up the project because it is cross-functional, it ensures a complete project (no critical steps are omitted), it leads to a better project selection and focused resources, it provides improved focus via gates where poor projects are killed and efforts can be redirected to more promising projects, and, finally, the project manages business risk.

The overall process, from the idea to launch, is based on nine stage and nine stage gates:



- Stage 0: Marketing Request (idea)

  It is the beginning of the project where the new product idea and proposal is described in the NPCP database, whit a feedback from all possible markets interested in the product.

- Stage 1: Product Definition

  In this stage is identified and completed the commercial benefit and the detailed product request called Detailed Product Requirement (DPR) for review and approval. In this phase there are also many other activities such as competitor analysis, estimated capital expenditure and net present value, etc.

- Stage 2: Design Concept – Technical Feasibility

  Here start a set of technical, commercial, environmental and safety evaluations of the DPR with the target to provide a time plan, cost profile of product and investment, a commercial agreement of the specification and risk factors. The result should be a physical chosen concept and an in line DPR contract.

- Stage 3: Product design assessment

  The target is to provide a fully developed prototype so the business can completely assesses the development specification, and then all issues, thoughts and comments regarding it must be shared from all functions, stakeholders and suppliers.

- Stage 4: Product and Process Development

The prototype and the manufacturing process receive a final assessment before ordering the supplier and manufacturing tooling: this means that the design must be freeze because there aren't big changes that could influence in an important manner the tooling and the product.

- Stage 5: Product and Process Industrialization

  It is the check and approval of the tooling parts to the design specification and to build the product with the definitive manufacturing equipment: after this assessment, all issues and risks due to reliability failure are known and manageable.

- Stage 6: Product and Process Validation

  It serves to release the parts and to evaluate the product reliability with laboratory, endurance and field tests: then, if the results are positive, communication can begin with customers.

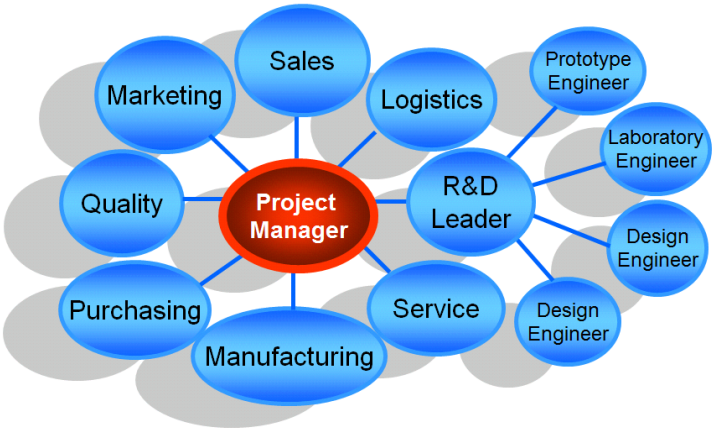
- Stage 7: Product Launch

  In this stage, there are the last evaluations before the launch to prove operations, supply chain and delivery process prior to build the zero-series and to complete the final evaluation of the product to ensure it meets the reliability requirements. At the end, there is the launch to the market.

- Stage 8: Post Launch

  It is a check if the product has been launched successfully or not, with a final evaluation that results in a lesson-learned document

Focusing on the project management in this complex process, it is worth to understand the role of the project manager. He is responsible for coordinating new product introductions for the entire path from concept to market and for delivering the project on time, to cost and to requested specification. In this kind of organizations, it is a crucial role and is new to some part of the business.



As we see in the picture above, all business functions need to be involved in New Product Development from concept to delivery to market and the project manager is accountable to manage all these cross-functional activities and parts.

The teams are inter-functional teams consisted of group of people working toward a common goal and made of people with different functional expertise. They could include people from finance, marketing, operations, human resources or other departments, and usually they involve employees from all levels inside and outside the organization (for instance suppliers, key customers, or consultants). Sometimes the team is also international, enhancing the importance of a good coordination from the project manager to link all the functions.

3.4. Lean Project Management

In the last years project management is seeing an attempt to change, following and integrating the principle of lean thinking developed by Toyota and already applied in the manufacturing area: the key factor is to try improving also the project management methodologies reducing waste and increasing the value as well as the production departments are doing in almost every organization.

Toyota was able to combine their existing tools of production in a set of principles that converge in a philosophy rather than a series of methodologies to be flexed and adapted to the environment.

"Lean Management is a system for organizing and managing all aspects of a business function by creating principles, practices and tools in order to develop goods and services with higher quality and fewer defects. The general outcome is to do this by using less effort, space, capital and time".

The methodologies of lean production and the management of projects can be combined to develop a new approach to project management: lean project management. This new methodology aims to improve both the effectiveness and efficiency of project management services by utilizing the management of project's emphasis on effectiveness and lean production's emphasis on efficiency. Thus, the new methodology is defined as ensuring the maximum effectiveness by defining the project requirements in terms of all factors that will influence the project and managing the project process to ensure efficient performance by paying particular attention to how value is reached.

Hence, the core thought is to eliminate and reduce the waste considering only what adds value in the processes: "Value add is everything to be kept as part of a process chain because:

- The customer is ready to pay for it;

- It modifies the product or adds necessary information to do it;
- It is legally or contractually binding".

First of all, it needs to understand the main pillars of Lean Thinking and, after that, to translate them in a set of principles that could be used in project management.

Lean Thinking is founded on five main beliefs:

1. Specifying Value: the first thing to consider is what the customer wants, needs and is willing to pay. The product has to satisfied the customer's needs at a specific price and time, so the value is to define the specifications, functions, capabilities of the product referring to the customer's requirements and that can be offered at a specific price. The idea is to create something that has a clear value to the customer's point of view rather than to consider only the income for the organization.
2. Identify the value stream: what is the entire set of actions required to realize a specific product? This action is applied to all three major tasks of a business: problem solving, information management and physical transformation. The value stream analysis points out three kinds of activities along the processes: value adding activities, necessary but not value adding and, finally, non-value adding. Understanding each of them in the whole stream, reveal how an organization can improve their tasks removing all types of waste in the entire business starting from the supplier and finishing with the customers.
3. Flow: the creation of a continuous flow of value is a big change in how things are done, redefining the work of functions, departments and firms observing the real needs of employees along the whole stream giving them an interest to make value flow. This thinking starts with the managers and is progressively shared with lower levels: it consist in creating the conditions to work better, in a more comfortable environment, empowering people and trusting them in their tasks. To build these states, there need clear objectives, intense concentration with no interruptions and distraction, sharp and immediate feedback on progress forward the objective, a sense of challenge during their tasks, the belief that their own skills are adequate and good enough to accomplish their tasks effectively and efficiently. Organizations where flow is continuous, change the psychological flow and perception of the work, giving more power and accountability to the employees and focusing on the perfection: obviously it is a long and challenging path that requires efforts from every single worker involved in the company.

4. Pull: in Toyota perception, following pull means to do things only when they are required, and this principle must be applied at every stage of value stream, avoiding overproduction. Pull requires to be very flexible and adaptable, reducing as much as possible stocks, inventories and resources, putting the demand as driver to production, traducing the process in a Just-in-Time process.
5. Perfection: with this pillar Lean Thinking wants to remark that the path to improve is continual and infinite, there is no end to the process of reducing effort, time, space, cost and mistakes with the contemporary target of better product for the customer's needs. While the first four principles work and interact with each other's in a virtuous circle, perfection suggests inspiration and direction, fundamental features to make progress in the right direction. Main base to follow this principle is transparency, making the entire value stream visible to all people involved (employees, suppliers, customers, etc.) because if it is visible it is comprehensible and everyone can propose new ways to improve it, both managers or low level workers.

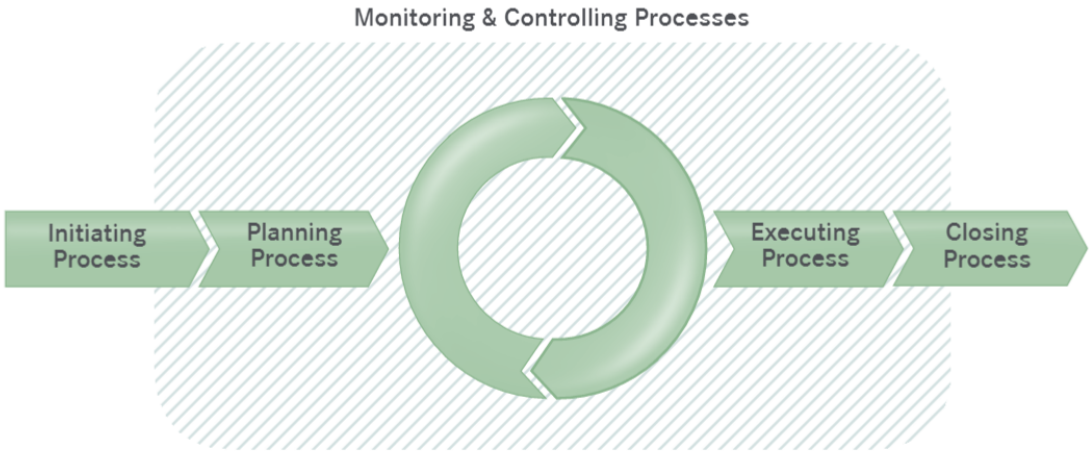
These five pillars were initially implemented and improved over time in the production areas, where simplification, elimination of waste, continuous improvement, quality at source and balancing production throughput were successfully applied with huge results for industries of every field. After this proofs and success, the philosophy started entering also in non-productive departments showing how much can be enhanced also in these areas and in the business processes. In the last decade has started the belief that the principles of lean production and the management of projects can be combined to develop a new approach to project management: lean project management. The target is to enhance either effectiveness or efficiency using the emphasis of effectiveness of the traditional project management methodologies merged with the focus on efficiency of the lean production, resulting in a general improvement in performance and value of project management.

With the time, these efforts to link lean thinking with project management brought to list a set of 14 principles that summarize lean management:

1. Long-term thinking, "make decision based on your long-term vision even if means making sacrifices in the short-term";
2. Flow the costumer value, identifying, reducing and eliminating wasteful activities and everything that doesn't add value to the final customer;

3. Produce at the rate of customer demand, using “pull” systems to avoid overproduction and unsold or obsolete inventory;
4. Level the workload, the production must be balanced across production facilities;
5. Quality right the first time, building a culture of stopping to fix problems rather than going over them;
6. Standardize and improve, indeed standardized activities, tasks and processes are the bases for continuous improvements and employees empowerment, without standards there can’t be improvements;
7. Use visual controls, everything must be showed clearly to everyone involved so no problems are hidden and misconceptions are avoided;
8. Use the right technology, reliable and thoroughly tested tools, that don’t add complexity to the processes;
9. Leaders are growth, not always bought outside the company: they must understand the work, live in the philosophy and teach or share it with others;
10. Personal development of people, enhancing and empowering internal employees that will start breathing their importance, attitudes and accountabilities inside the projects;
11. Treat partners and suppliers with respect, challenging them and helping them to improve, following cooperation and coordination in every situation and difficulty;
12. Gain first-hand understanding of problems, go and see which are the roots of possible issues instead of delegating to others less involved;
13. Build consensus before acting, deciding slowly and considering all options so people can easily accept them, and then implement rapidly;
14. Become a learning organization through constant and deep reflection and continuous improvements and evolutions

Translating all these pillars into the project management isn’t a simple and short endeavor, both because, as we said before, every project is unique and mostly because nowadays teams are international and inter-functional, so the philosophy must be understood and accepted by employees of different locations or cultures. However, with time and constancy many organizations have been able to apply successfully the concepts of Lean Management into Project Management, suggesting ways to do that in every phase of projects.



Simplifying, we can divide a project in five macro phases and analyze them giving advice on how Lean Management principles could be integrated in them.

In the first phase of initiating the process, the most important doubt that a company must have is if the project meets the vision and mission of the organization in terms of strategies and business targets. To assess that is basic to adopt the Project Portfolio Management, where the strategic objectives of an organization are counted and weighted, enabling a strict selection of which projects brings value and why, giving also immediate suggestions regarding the prioritization of them. Once the project is approved, a clear and sharp initiating and planning steps must be undertook pointing out possible issues or difficulties and forecasting the possible evolution of the project in order to prevent dangerous mistakes. In this phase, there is also the definition of the Project Manager/Leader and Team. The guide of the team have to understand and live the Lean Philosophy as well as to possess all needed technical, management and personal skills, he has to be involved from the beginning knowing all the deficiencies, and his authority must be known by every member of the team. Open-minded employees that breathe the company mission should compose the Team; an advantage might be to have dedicated people but if the roles are clear and well managed also not completely full-time workers can give big results: in this context must be hold the co-location, key point for many global projects.

The role of communication and information in those project is essential and difficult mostly for project managers, indeed tools such as Stakeholders Map and Project Charter help a lot developing good plans and practices to manage connections, decisions and tasks among complex projects. Charters documents, in Lean Management, have several roles and benefits: they keep visual contracts between people enabling a better understanding around the things and creating a

standard for future improvements and, furthermore, they imply cooperation and agreement to fill them creating a share place in which people have to speak and share ideas with the common goal to reach the final result.

Second segment is the Planning Process: it doesn't refer to put a simple and fast plan for the project, but rather the structure and processes elaborated by the whole team that outline how the project will be hand over efficiently, effectively and repeatable. In several global companies, this is well done by a dedicate office, called Project Management Office that is the referent for all projects of the firm worldwide. There is a main key that delivers success to projects: the data flow. For this reason is essential to create a governance structure that assure a timing and fast data flow among levels, defining a little number of levels each one administrated by a chief accountable. Those chief report information towards other level's leaders and follow the structure designed: this method helps the respect of hierarchies, without overload managers with questions that could bel held in lower areas. Once the governance structure is built, all parts and people must be able to communicate and interact so there is the need of a clear meeting structure where decisions or important things are discussed with the participation of all stakeholders on a regular cadence that allows the rapid continuation of the project. Besides to follow the escalation path with the meeting sequence, a division in operational and status meetings have to be set up to differentiate the focus and targets or every reunion. The operational ones aim to bring the project forward (Team meetings) while the others want to evaluate deliverables and more strategic questions to judge the progress of the project (usually attended by managers).

Meeting, activities and processes have to be defined clearly in a process landscape: the reason to do this documentation is that if people aren't able to describe what they do as a process, they don't know what they are doing in reality. This standardization and documentation assure several benefits: it increases repeatability and reduces the dependency between workers speeding up the project and reducing risks of misconceptions; it allows the project team to see the project's status and the participation of new members transferring easier the knowledge; it follows the Lean principle of continuous improvements, only possible in a stable and repeatable systems where it is feasible to spot the issues or mistakes and fix them once and for all. These actions and efforts, if well done, are accomplished only in the first projects providing a common and functional basis for the next projects that guarantees a certain level of reliability and success, remembering to register only the needful and essential information involved in the process, those that add value and

assure sustainability and repeatability (for instance: Governance Process, Document Control, Change Management, On-Boarding, Planning Process).

One of the more critical part of delivering a project is the planning because every project is different in size, budget or features, but some basic rules can be followed to build an efficient timing plan. These guidelines include the definition of a set of prerequisites and deliverables to start a series of tasks, prerequisites and deliverables to be strictly assessed in tangible ways (concrete elements) with the reaching of milestones. With deliverables assigned and milestones scheduled, it is possible to set the dependencies between functions helping the team specialists to manage issues or bottlenecks, adding resources only when it is indispensable and reporting easily the problem acting immediately toward the solution. Tools such as Microsoft Project or others similar provide a huge help, but only when the process is completely described and delineated, indeed they provide the collaborative workspace where people can work and communicate in every moment they need and wherever they are. After these planning steps, the project can start with a kick-off event presenting the path used to manage the project to all stakeholders involved.

Third segment is the executing process phase where the project managers and leaders have the overall accountability: as first step, it is essential to create a RACI chart (Responsible, Accountable, Support and Informed) that clearly define and document the roles and responsibilities of every team member. Other key topic in this step is the risk and issue management that has to be hold with a culture of communication, trust and cooperation among project leader and team members. A tool to deal with risks and issues is the RAID log (Risk, Action, Issues and Decision log) where everyone have access and can propose personal solutions, pointing out what can be managed at a low level and what have to be escalated to higher levels, and assuring a complete recording of the deviations undertook from the initial plan. It is important to remember that escalations must be considered only when stakeholders affected by a decision are not aware of the problem, and decisions must be linked with real facts and not only assumptions.

As said previously, operational meetings as escalations cover a key role in the lean project management. Hence, there are several criteria to follow to deliver efficient meetings: only people required, short and concise, to promote collaboration and cooperative culture and rules, awareness of topic and data available prior to the meeting, discussion and decision on facts, no mixture of different questions, following a standard agenda built in a specific manner. These suggestions assure to cover the main topics for first considering the RAID log and provide to the project manager an easier environment and path to manage the meeting.

In the Monitoring and Controlling Process the main purpose is to act in a preventive way, efforts must be addressed to identify and prevent possible risks and issues in order to proceed fluently in the project path avoiding dangerous incidents or time and money wastes. Key activity for this intent is the project performance reporting, that has to be simple, specific and as much visual as possible in places where everyone is able to view. It is essential to create a common culture of considering performance measurement as a way to improve rather than a control from senior managers, and it is helped by the judgement of people outside the project or the company. This imply a gradual path toward continuous improvement, one of the pillars of lean management. Team members should never be satisfied by the current result and process, thinking continuously to improve the process making activities simpler, faster and more efficient, providing to more employees the ability to manage changes and issues. With all the benefits of a gradual standardization and betterment of the process, however there is a big risk in the continuous flow: this is the change. The impacts of a change in a process must be analyzed carefully because it could be create creeps, slippages and delays not forecast and hardly detectable at the beginning.

The last phase is the Process Closing, not enough considered by many organizations after the completion of their projects. Analyzing what has worked well and what not, evaluating the issues met and how the team solved them and understanding the performances of the whole project, is the basis to improve the choices in the future and to enhance the value of next projects. During the years, team members could change, but the know-how of the company should remain and increase with the experience developed with projects. A useful documents and tools to do that are the Lesson Learned and the SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) that summary everything worthwhile happened in the project updating the company best practices needful for the success of venture projects.

Besides, the team has to understand how well it worked and which results has been reached by the company thank to it. The management board should recognize the value of their employees and, perhaps, identifies the best figures who demonstrated particular attitudes and skills toward project management, empowering them in the future challenges.

3.5. Future of Project Management

As we have understood, project management has radically evolved from its “birth” and will continuously grow with new features, strategies, tools and principle. One of the clearest

tendencies is the virtual work: already started in the last years, nowadays, advanced communication software are becoming affordable for every sort of organizations, allowing new ways to work without the need to be in office for all the time. People can do many of their task from home or in separate places, increasing the possibility to create international teams with members of different locations or states working virtually taking advantages of the evolution of communication systems to save time, budget and effort in long journeys and trips. However, this trend and need, leads to an increasing effort in effective communication, trust, control and leadership, aspects that will be the challenges for the next decades. For that reason the role of project manager will be increasingly demanded and recognized by firms all over the world. With the fast and sudden changes of the dynamics and environment of organizations, future project managers must be able to adapt their skills and tools, following the high rate of evolution due to technologies growth and coordinating multidisciplinary knowledge, being able to collect and analyze big amount of data and information in less and less ranges of time choosing the right decision, developing the ability to work most of the time across-networks and so changing effectively the manner of communication and leading teams.

There will be more uncertainties, risks, steady change and fast disruptions that companies will face, and this is reflected also in project management. Concepts such as globalization, competition, limited resources, difficult stakeholders and so on, are already known inside the projects environment but they will increasingly present and influent in managing and decisions-making.

Other noticeable trend is the implementation of social project management software and tools that helps employees to collaborate, communicate, share and manage following the ongoing need of distributed and virtual teams. Obviously this unavoidable changing has advantages such as performance improvement, time saving, clear organization and many others, but it carries also several threats in comparison with the traditional way for instances lack of verbal communication among people, misunderstandings not immediately visible, decision-making only on data rather than data and debate with the entire team, etc. Hence, the ability of project manager and senior managers will be to use all the tools offered by technologies and evolution in parallel with their capabilities of management and coordination, understanding that if they have to work virtually this implies a bigger effort monitoring and controlling every project's step, shifting from real conversation and debates towards a virtual world dominated by social software and spaces.

As the role of project manager and project management is being considered essential, also the methods are changing and evolving following the path of agile project management. Over last years, the time to market of projects has decreased consistently, and it will even more fast in a short time. It means that the project management life cycle have to be shorter, delivering more quickly, implementing successfully techniques such as iterative prototyping, rolling wave planning or agile management, marking which organizations will win the challenge of project management in these and next decades of deep change in the global business environment and in their process structures.

4. Activity one: IT Communication Management process in the R&D Centre of Baxi S.P.A in Bassano

4.1. The role of communication in Project Management

One of the most important and deep roots of projects' failure is the communication and the sharing of data, often subconsciously underestimated and not considered in the main improvement plans of small and big companies. The importance of communication in the success of a project is huge and immeasurable.

Typical literary definitions of effective communications include:

- An exchange of information;
- An act or instance of transmitting information;
- A verbal or written message;
- A technique for expressing ideas effectively;
- A process by which meanings are exchanged between individuals through a common system of symbols.

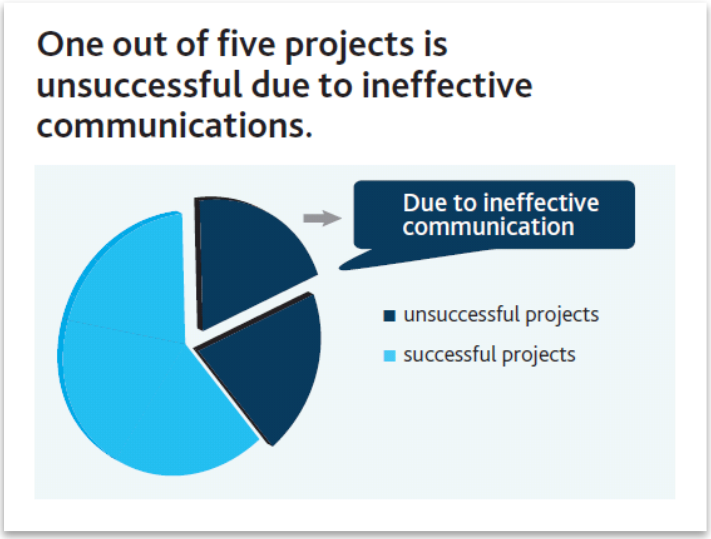
Effective communication involves both sending and receiving the message in every kind of shape (written, vocal, visual, etc.). With this in mind, a good definition of project communication management can be "Project Communications Management includes the process communication in project management required to ensure timely and appropriate generation, collection, dissemination, storage, and ultimate disposition of project information".

Whether it's in person or via email, with a sponsor or a stakeholder, effective communication serves as the very pillar of business. It can influence public opinion, give teams a sense of purpose, persuade executives to increase funding and boost project success rates.

Highly effective communicators are also more likely to deliver projects on time and within budget, as we can see in the figure in the next page. Indeed, studies have found that communication interferes in every part and field of the project, either goal or time or budget, and the success rate of a project is strictly linked with the quality of people's interaction and information's flow at every level of the hierarchy, inside or outside the company and the project.

A report published by PwC said industries with effective and efficient communication methods are more likely to stay within scope, to meet quality standards and to deliver intended business benefits and hence it guarantees a top position in markets.

“A good communication process keeps stakeholders engaged and project teams motivated,” says Graham Colborne (member of the PMI Global Executive Council), pointing out the high value of the relationships between people involved in the project.



However, a proper communication both inside and outside the firm walls remains a rare commodity much of which comes down to a fundamental difficulty in communicating with the appropriate clarity, detail and timing. Sometimes it's the project manager who can't stop outlining every single technical step in excruciating detail to the executive committee. Other times it's the executive board unable to translate the grand strategic vision into actual project objectives and scope. Alternatively, it's the sponsor who doesn't engage with external stakeholders beyond a press release or a simple report. No matter the scenario or the fault, the result is the same: a lack of effective communication dramatically increases the risk projects face and the likelihood that they will fail during their path. Ineffective communication is to accuse for more than half of projects that fail to meet business and strategic goals.

4.2. Target of the activity

The communication process in a multinational company is a very wide field, impossible to analyze only in several months: so we limited the survey about the IT Systems in the R&D Center, which provide the ways where information and data run and are stored. For this point, we had to start from the root of the company pointing out the common developing of systems in big companies. At the beginning, every company starts buying one system shared and accepted by all employees, but over time, with the increasing of sizes, functions and departments, we have assisted at a multiplication of the systems used. It means that people have several different ways to communicate and where accomplish their usual tasks, and even it is positive because everyone uses the best tool for his work, it brings to dangerous issues and trouble: data multiplication, dispersion of information, slowness in finding files, misunderstandings between colleagues, mistakes, and many others.

All these things have one big meaning for companies of every size: waste of time and money.

Obviously, seen all these problems already collected by the literature, several questions appeared logic: could be more efficient? Are we making mistakes in communication management? There are difficulties or needs to improve? Are we using all potentialities of IT Systems that we currently have? Is missing something in our data flows?

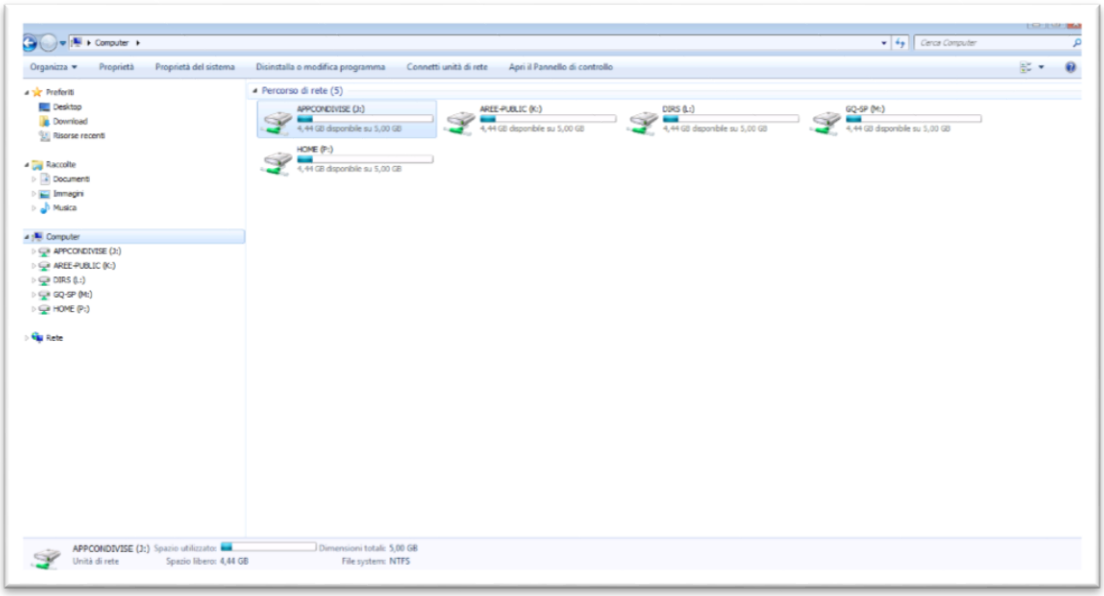
Therefore, we decided to conduct an analysis of the IT Systems used in the company with this main belief: the improvement of the data and information flow will enhance the performances throughout the developing and manufacturing process, leading to better products with less wastes of time, money and issues.

Hence, the final target of the research was to optimize the way with which employees store and share data information during the entire process, helping the communication between members of the teams and reducing stress due to the data dispersion.

4.3. IT systems overview

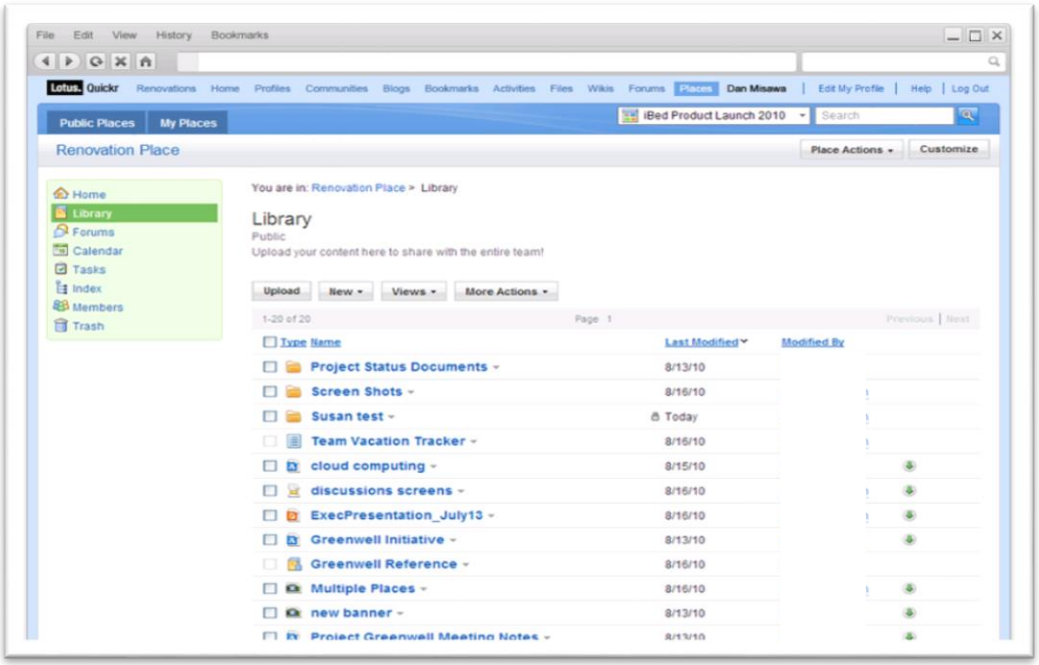
Currently, the company has nine software already installed where all employees work and it is evaluating another one, which could provide an innovative way of thinking:

- ***File system Bassano*** is used to store and retrieve document and data, it is used only locally. Without a file system, information placed in a storage area would be one large body of data with no way to tell where one piece of information stops and the next begins. By separating the data into individual pieces, and giving each piece a name, the information is easily separated and identified. Taking its name from the way paper-based information systems are named, each group of data is called a "file". The structure and logic rules used to manage the groups of information and their names is called a "file system". File systems allocate space in a granular manner, usually multiple physical units on the device. The file system is responsible for organizing files and directories, and keeping track of which areas of the media belong to which file and which are not being used.

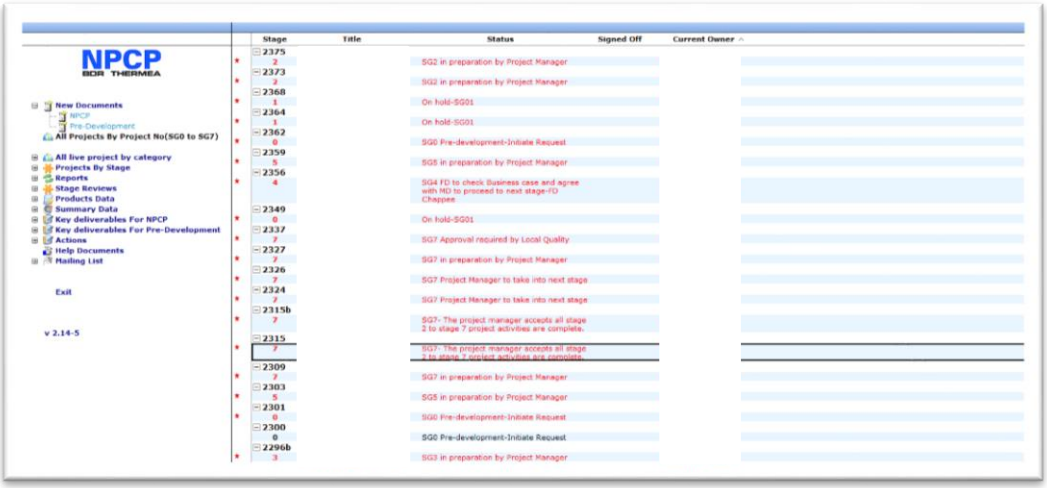


- ***File system Remeha*** is the same of the previous but instead of being used in local place it is shared with the global Group using network connection, and the storage is dislocated from Bassano.

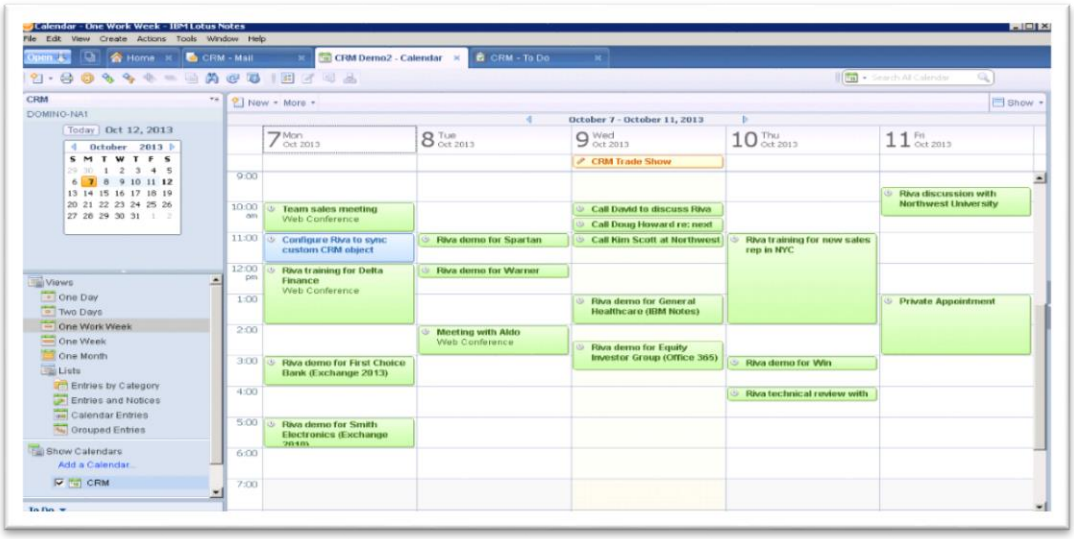
- ***IBM Lotus QuickR*** is team collaboration software that can help accessing and to interacting with people, information and project materials needed to get the work done. Lotus QuickR team spaces, content libraries, team discussion forums, wikis, and connectors make it easy to share documents and information amongst a team, and this software works well with the enterprise content management system, also thanks to Lotus QuickR Connections that allows to integrate and link Lotus QuickR with or inside other platforms.



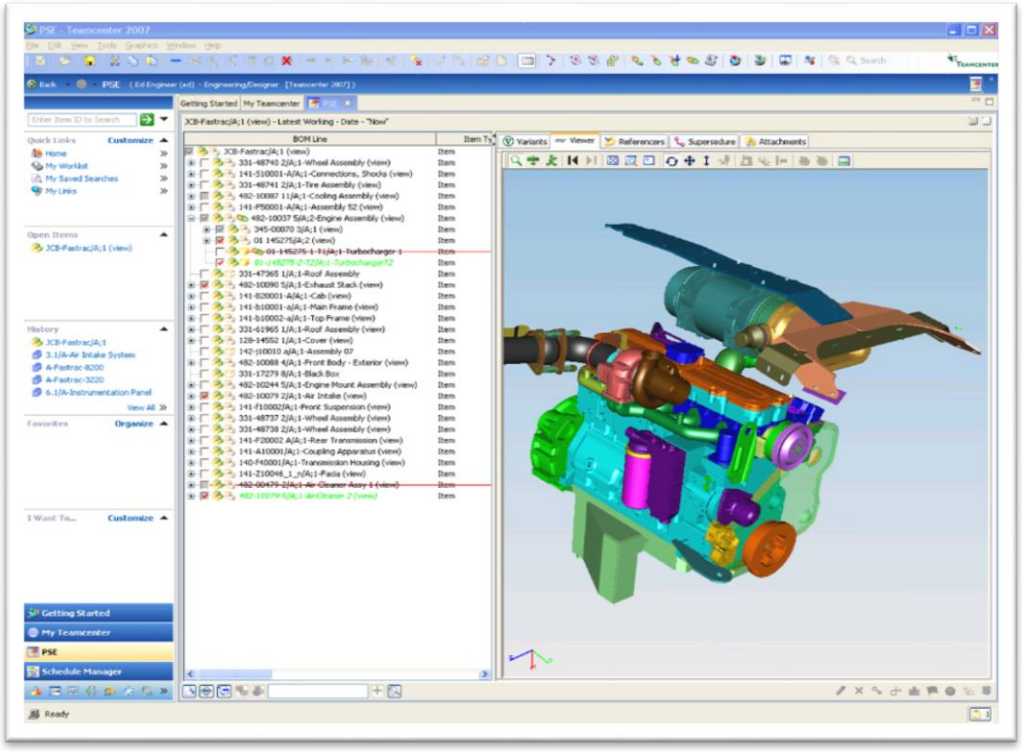
- ***NPCP 2.0*** is a platform custom built on projects management and development. It allow the employees of each department to work following a preset flow of activities to ensure a well-done product in output. The process followed in this platform is based on PRINCE 2 that is a project management “road map” for getting a project through a successful and controlled start, middle and end.



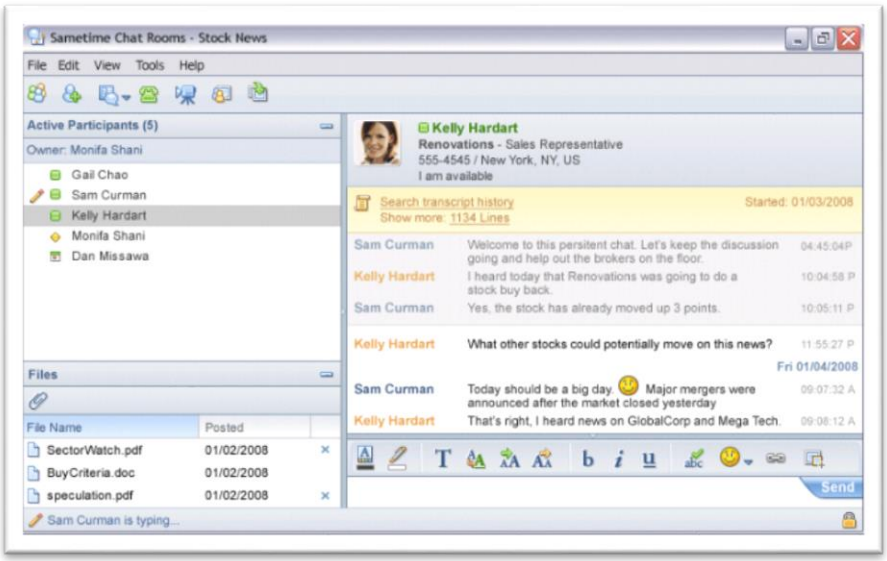
- *IBM Lotus Notes* is a desktop application that organizes and displays databases on a user's local workstation. The physical database files can be stored either on the workstation itself or on a server. A typical Notes client "workspace" will have icons for a handful of local databases as well as a number of databases that reside on one or several Notes servers. All of these icons can be grouped together, so that the distinction between local and remote data becomes very trivial. It includes the following components: e-mail, calendaring and scheduling, address book, database, web server, programming.



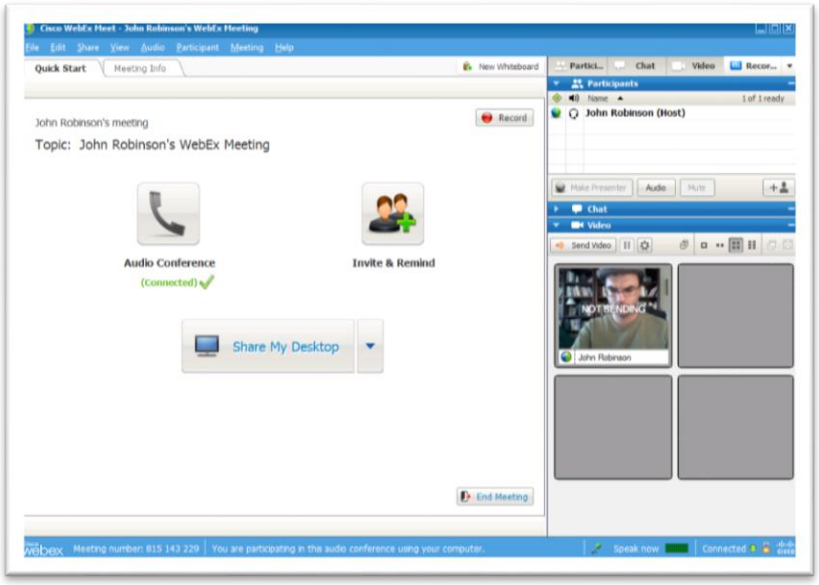
- *Siemens Teamcenter* is the world's most widely used product life management system and it enables to manage and share product designs, documents, BOMs (Bill of Materials) and data. It uses standardized workflows and change processes to streamline efficiency throughout your organization. People can find, share, re-use engineering designs, documents and BOMs. Teamcenter can be used to manage requirements, include suppliers and connect engineering with manufacturing and service. This software drives productivity across global product development and manufacturing organization: individual and team productivity to do more with less, application productivity for end-to-end PLM (Product Life Management), IT productivity for greater return-on-investment.



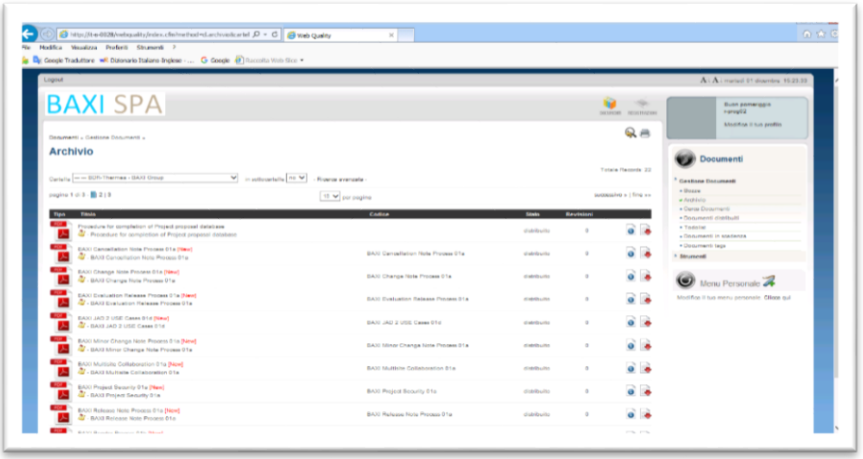
- ***IBM Sametime*** products integrate real-time social communications into business environment, providing a unified user experience through instant messaging, online meetings, voice, video and data. With just one click, it instantly connects people, helping to meet the ongoing demands of everyday business. IBM Sametime supports social communications with features that include enterprise instant messaging, online presence indicators and community collaboration, online meetings, mobile device support, voice and video integration, simple user experience and flexible platform.



- ***Cisco WebEx*** meetings accelerates business results by making web meetings more productive. It is a social platform: this people-centric collaboration solution can enable team members to share information easily through any computer or mobile device. It allows people to attend meetings any time, from anywhere, inside and outside corporate firewalls. It enables meetings with remote participants: employees, customers, and partners can attend meetings from anywhere. It allows incorporating video into meetings: improve communications, relationships, and productivity by making it easier to meet face-to-face over distance. It makes possible to collaborate with external organizations: easily share information, interact in real time, and communicate across channels beyond email and telephone.



- ***Web Quality*** is a database where many departments store documents and certificates, with approvals and assessments before publication. It is also used to send surveys and analysis around the employees. For our analysis, we built and sent the survey to users through this software that allows also to collect all results and to export them in an Excel spreadsheet where it is easier to conduct studies and comparisons.

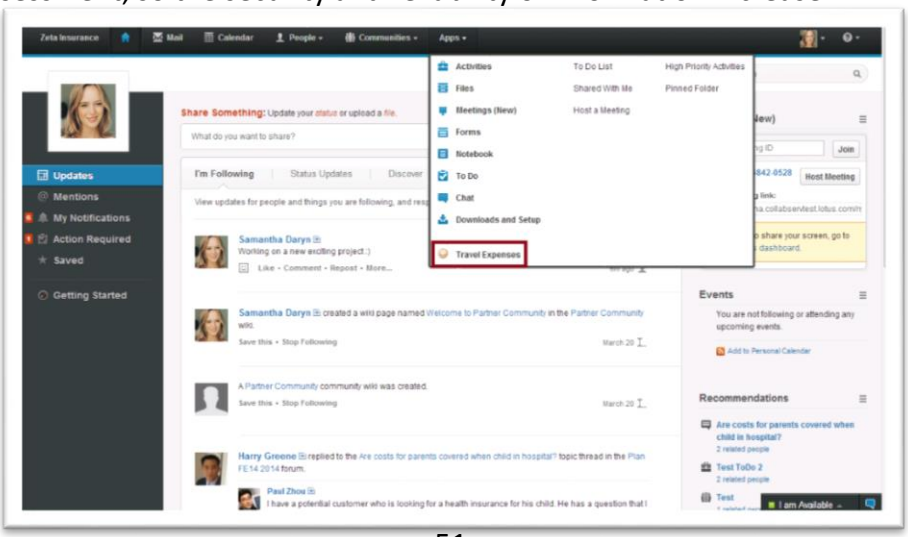


- *IBM Connections* is a Web 2.0 enterprise social software application developed by IBM. The goal of IBM Connections is to empower companies to be more innovative and help them execute more quickly by using dynamic networks of co-workers, partners and customers. It provides social networking tools for businesses to use to bring together people through online tools. Social network platform helps improve knowledge sharing, decision-making and innovation. This market leading social network platform can help you:

- Empower people: innovate anywhere (mobile, web and desktop, even offline);
- Engage people: filter out the noise, illuminate ideas;
- Inspire innovation: people-centric platform allows ideas and communities to thrive;
- Trust people: safely collaborate with customers and partners, bringing them into the conversation.

This is the new platform that could be implemented whit the role of “middleware”, that is a general term for software that serves to "glue together" separate, often complex and already existing, programs. Some software components that are frequently connected with middleware include enterprise applications and web services. Middleware often sits between the operating system and applications on different servers and simplifies the development of applications that leverage services from other applications. This allows programmers to create business applications without having to custom craft integrations for each new application.

Finally, we can conclude saying that the improvements of IBM Connections are firstly the focusing on the project, where all people are able to work in the same place without information dispersion. Secondly, the several social functions that allow employees to save time and energy when they have to communicate or interact among themselves. Third positive thing is the peculiarity of the middleware that provides always one version of the files with history and a workflow of assessment, so the security and reliability of information increase.



The first step of the study was to understand the principal needs and requirements of the users (in this case analyzed, they were the forty R&D employees).

We conducted this study building a survey, through Web Quality software, composed of ten multiple-choice questions formulated on a previous pre-analysis of what could be the main issue or issues for the final user in general, who works every day with all the software mentioned above. For each question there were given five choices, each ones with an objective mark (for nothing = 2 ; not much = 4 ; sufficiently = 6 ; enough = 8 ; very much = 10) so at the end we were able to reach an objective result, more two open questions were we let to say subjective opinions or particular considerations regarding all software compared.

These were the ten questions given to users:

1. How much does the opening speed of files impact in your daily work? Give a mark of the opening files speed for each software (Not used – Slow – Normal – Fast)
   1b) Which software do you consider unreliable?
2. Do you consider complex the search of files and official documents in the storage systems of the company?
3. Do you consider important the possibility to share a document where you could work together with other members of the team?
4. How much satisfactory do you rate the data access (documents, information, applications, E-mails, etc.) in the several areas of your competency? (e.g. permission requests to read, to write, to approve, etc.)
5. Is important for you to have under control the closure timing of activities that have been assigned to you?
6. Do you think that the used templates cover completely and efficiently all activities that you usually do?
7. Is important for you the opportunity to have stored the document history? (E.g. how was the document two weeks ago? Which modifications are been made three weeks ago?).
8. Do you consider sufficient the several IT software currently adopted by the company to manage your work?
9. In your opinion could be interesting the use of tablet inside the company for next future?
10. Do you rate important to be able to see the importance of a document according to a system that considers the number of clicks/visualization of the same document? (e.g. ranking system, Facebook's Like, You Tube visualizations, etc.)

10b) Do you have any suggestion, improvements or advice regarding the management and organization data systems of the company?

Thus, we sent this survey to the forty-one users of R&D Centre and after 3 days, we gathered all results in an Excel spreadsheet to have a measurable indicator for every single question. Furthermore, we collected in a Word document all specific advice and suggestions written by users regarding the software, in order to have also personal points of view for future improvements.

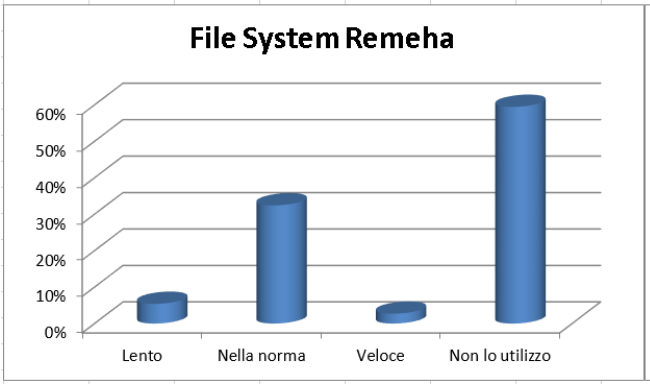
NOTE PERSONALI UTENTI	SITUAZIONE ATTUALE	STATO	POCA AFFIDABILITA' SOFTWARE
utilizzare il database teamcenter per tutti i documenti tecnici aziendali invece che tante cartelle su db Windows (inefficaci e labirintose da individuare)	Fa parte della ns ricerca	da fare	lotus notes +3
QUICKR non mi va bene perchè spesso devo cercare doc che 1) Non so se esistano, 2) So che esistono ma non so dove sono e non essendo abilitato a TUTTO, a chi chiedo l'abilitazione di cosa? E poi, magari devo solo darci un'occhiata di 2 minuti, e devo perdere giorni per capire e avere l'abilitazione da persone non a Bassano.... QUICKR a parte, per me il focus/problema è la dispersione, la strutturazione, la sintesi dell'informazione che, a progetto finito, ha bisogno di tempo che non c'è per tutte queste cose ... O magari è divisa fra strutture diverse di diversi enti		istruzione	quickr +2
Per migliorare la ricerca dei file, sarebbe importante avere un omogeneo modo di archiviazione (sia nella creazione delle directory sia nei nomi file) utilizzato allo stesso modo da tutti gli enti.		già implementato	teamcenter + 7
migliorare teamcenter			
Integrare Movex in Team Center o comunque creare una migliore corrispondenza. Ad esempio rendere disponibili direttamente in team center (per un determinato codice) giacenze a magazzino, fornitori,ordini previsti, costi, impieghi, distinta scalare ecc	Integrazione Futura	da fare	
Il sistema MOVEX non permette di fare ricerche sul database delle distinte basi imponendo dei filtri (p.e: fornitori, tipo componente, prezzi, mercati,...) Sarebbe molto molto utile avere tale funzionalità.	Estensione profilo per xR&D	da fare	

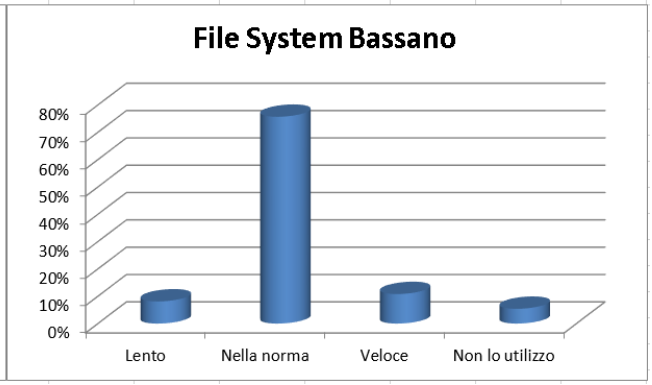
Id	File System	File System	NPCP	Teamcenter	Quickr	Lotus notes	Microsoft	Web Quality	A	B	C	D	E	F	G	H	I
14075	Non lo utilizzo	Nella norma	Non lo	Nella norma	Non lo	Nella norma	Nella norma	Nella norma	6	10	8	8	8	10	8	8	4
14074	Nella norma	Nella norma	Nella norma	Non lo	Lento	Nella norma	Non lo utilizzo	Nella norma	6	8	4	8	8	8	4	8	2
14073	Nella norma	Nella norma	Lento	Lento	Non lo	Nella norma	Nella norma	Nella norma	6	8	6	8	8	8	8	10	6
14072	Non lo utilizzo	Nella norma	Nella norma	Non lo	Non lo	Nella norma	Non lo utilizzo	Nella norma	8	6	6	8	6	8	6	6	10
14070	Non lo utilizzo	Nella norma	Nella norma	Lento	Nella norma	Nella norma	Nella norma	Nella norma	8	10	6	10	8	6	8	8	8
14069	Non lo utilizzo	Nella norma	Non lo	Lento	Non lo	Nella norma	Non lo utilizzo	Lento	8	8	8	6	4	8	6	6	8
14068	Non lo utilizzo	Nella norma	Nella norma	Nella norma	Non lo	Nella norma	Non lo utilizzo	Nella norma	4	8	8	10	8	6	4	8	8
14067	Nella norma	Nella norma	Nella norma	Nella norma	Non lo	Nella norma	Nella norma	Nella norma	6	8	6	6	6	6	6	4	4
14066	Non lo utilizzo	Nella norma	Non lo	Non lo	Non lo	Lento	Non lo utilizzo	Lento	6	10	6	10	6	10	6	8	8
14065	Nella norma	Nella norma	Nella norma	Lento	Nella norma	Nella norma	Non lo utilizzo	Nella norma	8	4	4	6	6	8	6	2	2
14064	Non lo utilizzo	Nella norma	Nella norma	Nella norma	Lento	Lento	Non lo utilizzo	Nella norma	6	6	6	8	6	4	6	6	4
14063	Non lo utilizzo	Nella norma	Nella norma	Non lo	Non lo	Lento	Non lo utilizzo	Nella norma	6	8	6	8	4	8	8	8	4
14062	Nella norma	Nella norma	Non lo	Nella norma	Non lo	Nella norma	Non lo utilizzo	Non lo	8	10	8	10	8	10	8	2	2
14061	Lento	Nella norma	Veloce	Veloce	Lento	Nella norma	Non lo utilizzo	Nella norma	8	10	10	10	6	10	6	6	8
14060	Non lo utilizzo	Veloce	Veloce	Lento	Nella norma	Nella norma	Non lo utilizzo	Veloce	4	8	6	10	6	8	6	8	4
14059	Nella norma	Nella norma	Nella norma	Nella norma	Non lo	Nella norma	Non lo utilizzo	Nella norma	4	10	8	8	4	6	6	6	6
14058	Non lo utilizzo	Non lo utilizzo	Non lo	Non lo	Non lo	Nella norma	Non lo utilizzo	Nella norma	8	10	6	10	6	10	6	10	8
14057	Non lo utilizzo	Nella norma	Nella norma	Nella norma	Nella norma	Nella norma	Non lo utilizzo	Nella norma	6	6	8	8	8	4	10	4	4
14056	Non lo utilizzo	Lento	Lento	Lento	Non lo	Lento	Non lo utilizzo	Non lo	4	4	4	10	6	10	4	10	2
14055	Nella norma	Nella norma	Nella norma	Nella norma	Nella norma	Nella norma	Nella norma	Nella norma	6	10	8	10	6	8	6	4	8
14054	Non lo utilizzo	Nella norma	Lento	Lento	Non lo	Lento	Non lo utilizzo	Non lo	2	10	2	10	6	10	2	4	2
14053	Nella norma	Nella norma	Non lo	Nella norma	Non lo	Nella norma	Non lo utilizzo	Non lo	10	6	4	8	8	4	4	6	4
14052	Non lo utilizzo	Veloce	Veloce	Non lo	Nella norma	Nella norma	Non lo utilizzo	Veloce	6	10	10	10	6	10	6	10	10
14051	Nella norma	Lento	Non lo	Lento	Nella norma	Nella norma	Non lo utilizzo	Non lo	8	10	4	8	10	10	6	8	2
14050	Non lo utilizzo	Nella norma	Non lo	Lento	Non lo	Lento	Veloce	Non lo	6	8	6	10	8	4	8	8	2
14049	Non lo utilizzo	Nella norma	Lento	Lento	Non lo	Lento	Nella norma	Nella norma	8	6	4	8	10	4	8	2	4
14048	Non lo utilizzo	Non lo utilizzo	Nella norma	Nella norma	Non lo	Nella norma	Non lo utilizzo	Nella norma	6	8	6	6	8	6	8	4	4
14047	Non lo utilizzo	Nella norma	Nella norma	Nella norma	Non lo	Lento	Non lo utilizzo	Non lo	8	8	6	8	6	6	4	2	8
14045	Veloce	Veloce	Nella norma	Non lo	Nella norma	Veloce	Non lo utilizzo	Nella norma	8	6	6	10	8	4	6	4	4
14044	Nella norma	Nella norma	Nella norma	Lento	Nella norma	Nella norma	Nella norma	Nella norma	6	4	4	8	6	10	6	6	8
14043	Nella norma	Nella norma	Nella norma	Veloce	Nella norma	Veloce	Veloce	Nella norma	8	10	6	10	6	8	6	10	4
14042	Lento	Nella norma	Lento	Lento	Non lo	Nella norma	Lento	Nella norma	8	6	4	6	6	8	6	6	2
14041	Non lo utilizzo	Lento	Veloce	Lento	Nella norma	Nella norma	Non lo utilizzo	Veloce	8	10	10	10	8	6	6	10	8
14040	Nella norma	Nella norma	Nella norma	Veloce	Non lo	Lento	Non lo utilizzo	Nella norma	4	10	8	10	8	10	8	10	8
14039	Non lo utilizzo	Nella norma	Non lo	Nella norma	Nella norma	Nella norma	Non lo utilizzo	Non lo	6	8	10	8	8	4	8	4	4
14038	Non lo utilizzo	Nella norma	Non lo	Nella norma	Non lo	Nella norma	Non lo utilizzo	Nella norma	6	10	8	10	6	8	10	8	8
14037	Non lo utilizzo	Veloce	Veloce	Non lo	Veloce	Nella norma	Non lo utilizzo	Nella norma	6	10	6	10	6	8	6	8	8

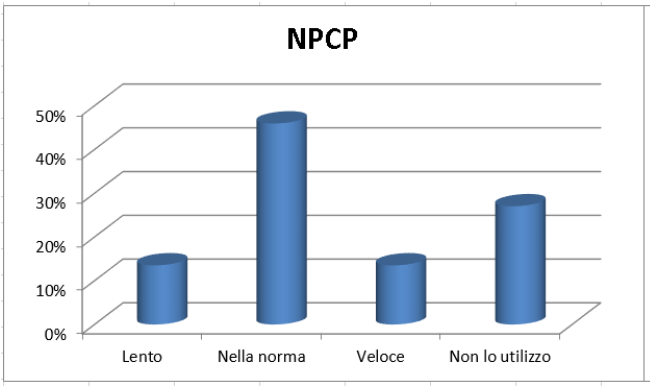
At the end of this first step we built a chart for each question to evaluate the users' responses and to track and analyze the results of this survey.

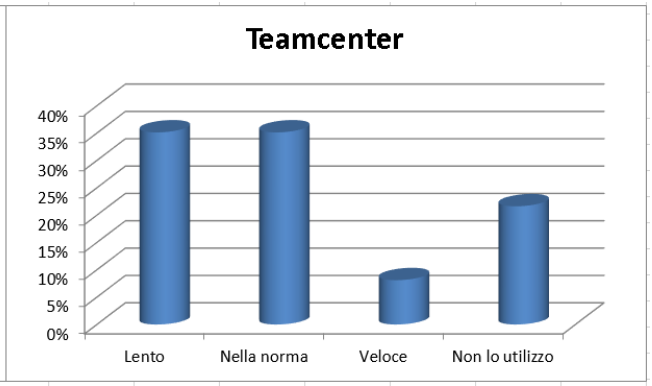
Question n°1

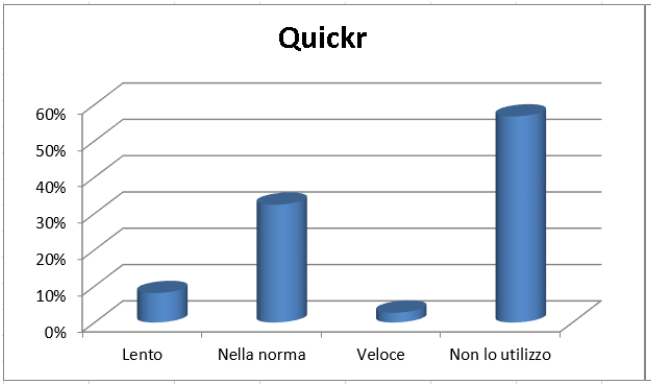
INFLUENZA DELLA VELOCITA' DI APERTURA DEI FILE NEI SOTWARE

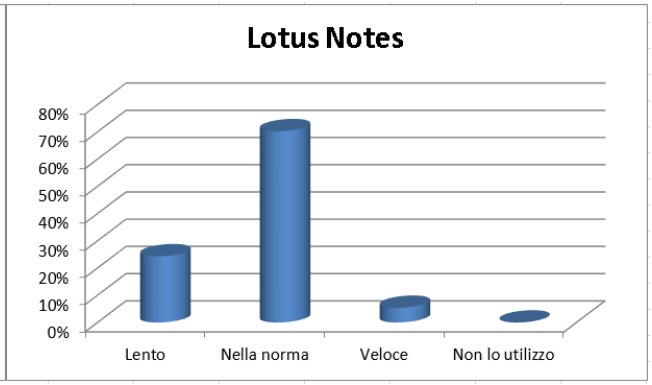


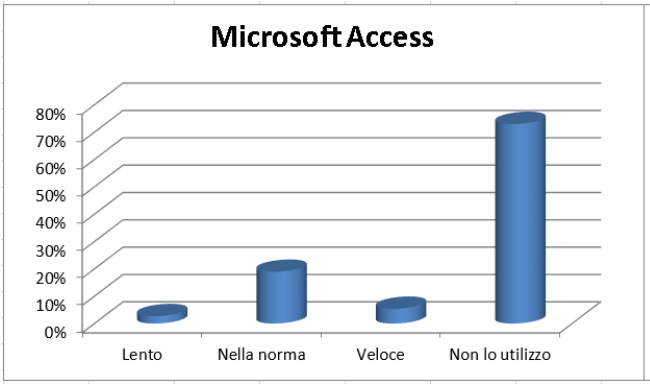


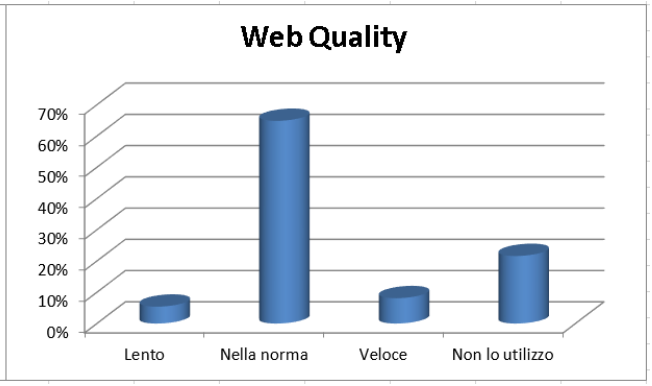




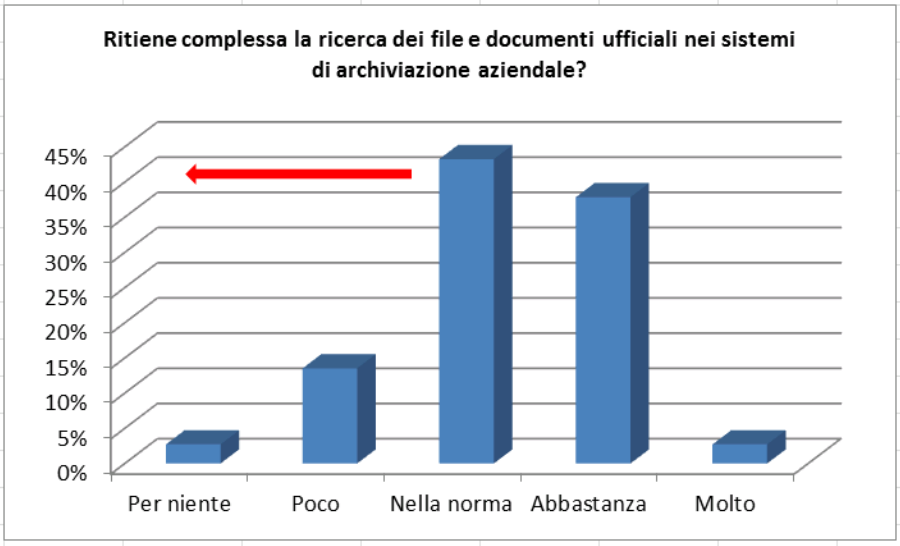




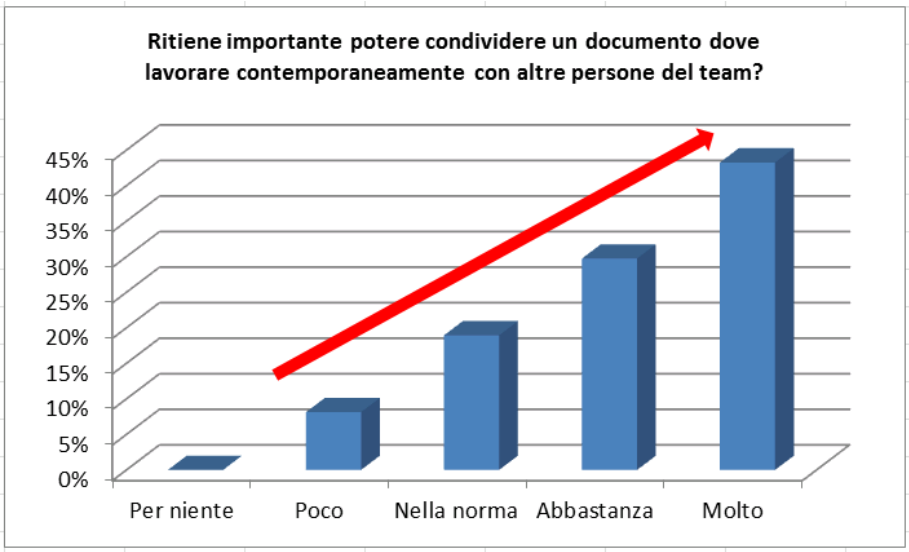




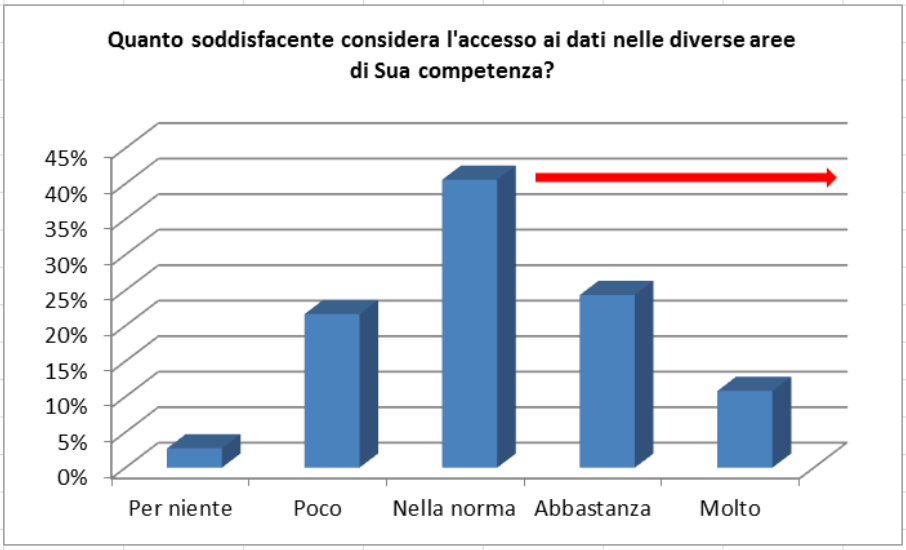
Question n°2



Question n°3



Question n°4



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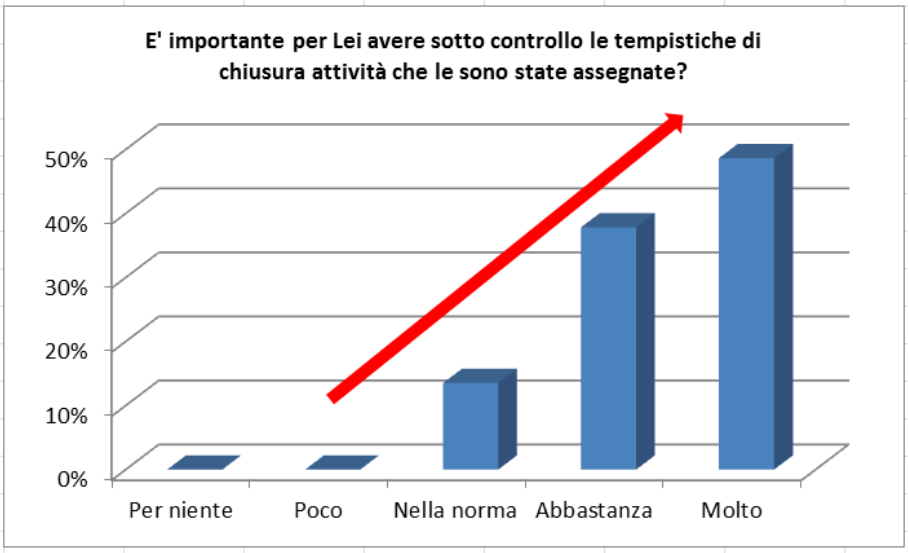

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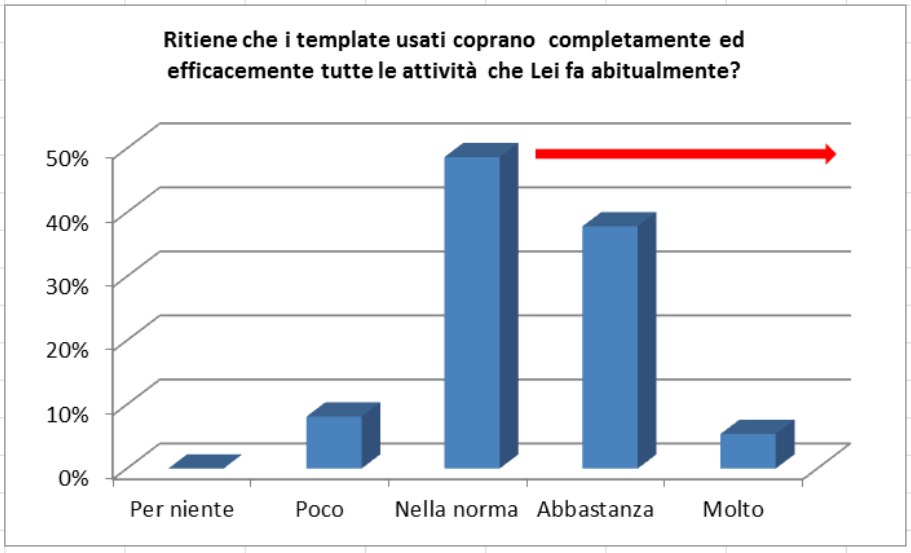

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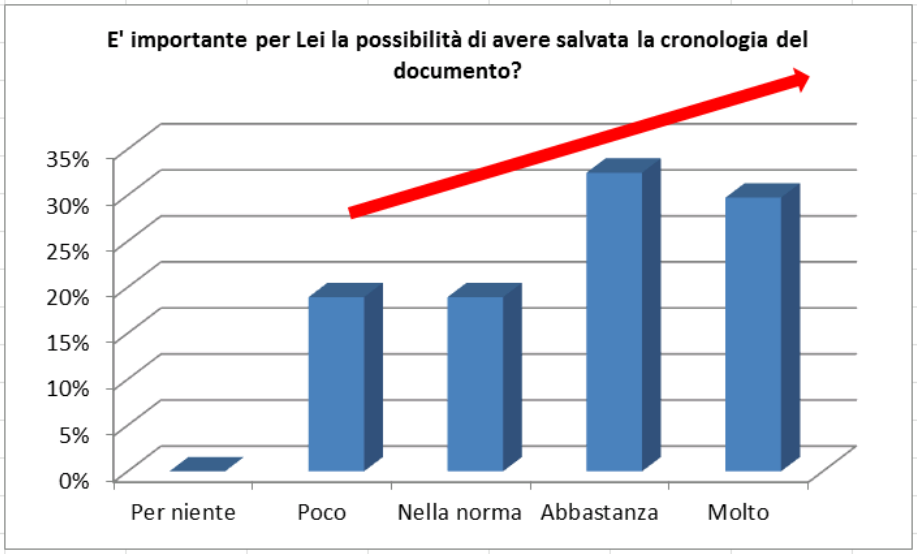

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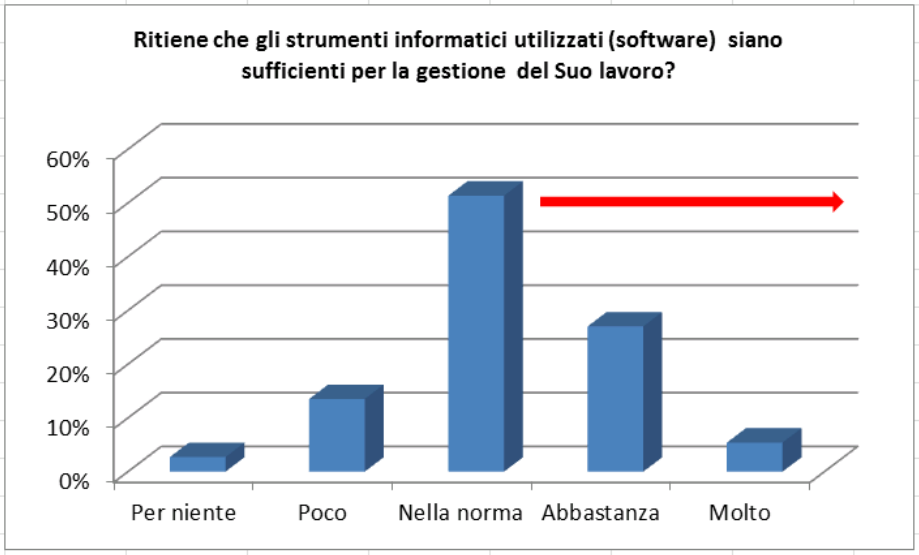
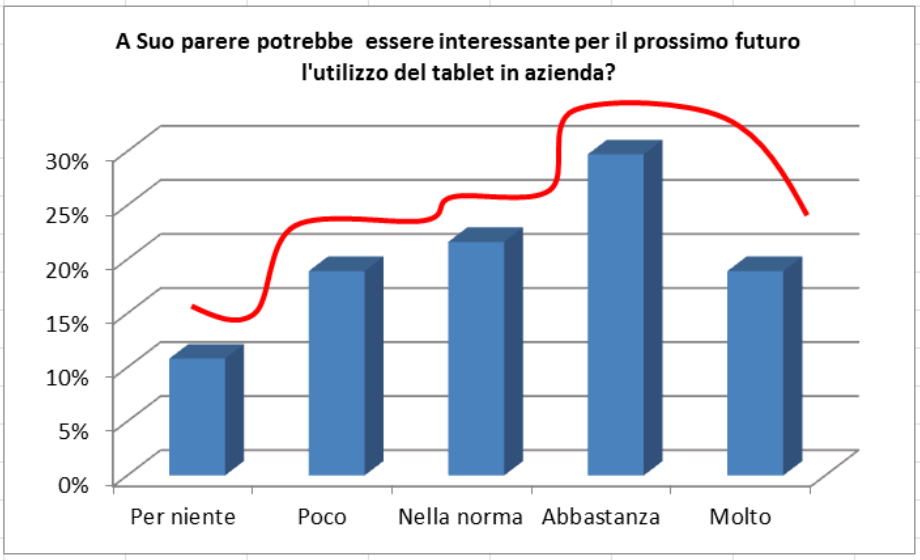
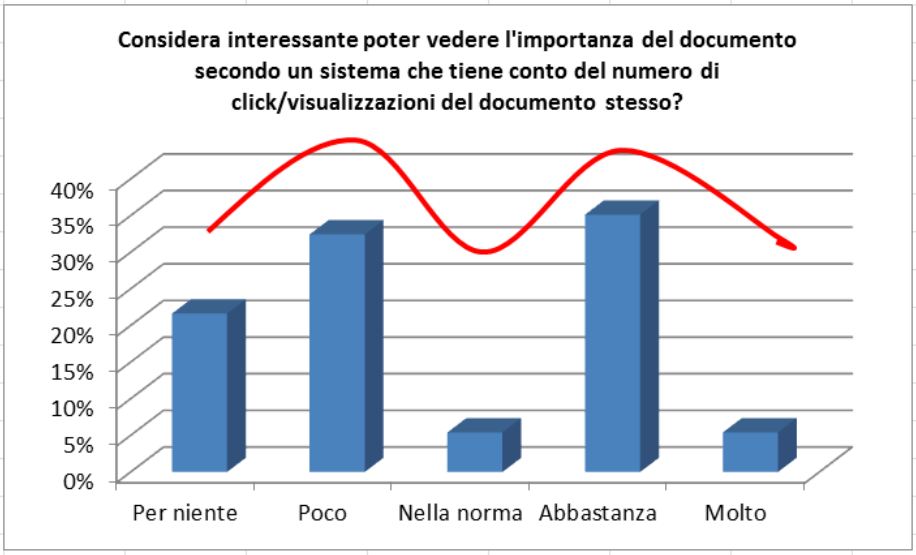


Question n°9



Question n°10



The second step was to compare all IT systems currently used in the company in an objective manner to match them on several parameters and indicators. We chose five macro-areas, which contain several single function:

- Main native function;
- Files storage;
- File sharing;
- Social / E-mail / Communication;
- Usability;
- Speed of software's opening;
- Speed of files' opening;
- Integration with other software and upgrade opportunity through plugin;
- Offline functioning;
- Easy files' search in all documental archives;
- Planning and organization of activities;
- Reminder activities;
- Customizable interface and framework;
- User-friendly interface;
- Ranking system;
- Social function;
- Groups of work creation;
- Data sharing with other departments worldwide;
- Data sharing in local;
- Contemporaneous work in the same document;
- Instant chat;
- Safety and reliability;
- Versioning (memory of operations);
- Files protections;
- Possibility of annulment/recovery operations;
- Document assessment before publication;
- Portability;
- Installation on mobile devices.

For each of these single indicator we gave a mark between:

0 = function not satisfied

1 = function partially satisfied

2 = function completely satisfied

Marks are been chosen assessing the literature found in the respective website of each software individuating the precise function considered. Furthermore, we spoke with the reference person of every software inside the company to compare the marks found on internet with their personal opinion and knowledge about the software. Therefore, putting all these objective judgments in an Excel table, we were able to understand which software has more potentiality, peculiarity or constraints regarding the functions considered in our case.

Benchmark sistemi di gestione dati e comunicazione informazioni R&D

Macro differenziazioni		File System Bassano	File System Remeba	QuickR	QuickR Connections	Lotus Notes (NPCP)	Lotus Notes	Teamcenter	IBM Sametime	IBM Connections	WebEx	Web Quality	Microsoft Tools	Morez
	FUNZIONE PRINCIPALE													
Descrizione	Archiviazione file	2	2	2	2	2	1	2	0	2	0	2	2	0
Descrizione	Condivisione file	1	1	2	2	2	2	2	1	1	2	2	1	0
Descrizione	Social / E-mail / Comunicazione	0	0	2	2	2	1	1	2	2	2	1	0	2
		3	3	6	6	6	4	5	3	5	4	5	3	2
	USABILITA'													
Fruibilità	Velocità di apertura software	2	2	2	2	1	1	2	2	2	1	2	2	2
Fruibilità	Velocità di apertura file	2	2	2	2	2	2	1	2	2	2	2	2	2
Fruibilità	Integrazione con altri software e upgrade funzioni tramite plugin	0	0	2	2	2	2	2	2	2	2	1	2	1
Ricerca documentazior	Funzionamento offline	0	0	0	0	2	2	0	0	0	0	0	2	0
Ricerca documentazior	Semplicità ricerca file su tutti gli archivi documentali	1	1	1	1	1	1	2	0	2	0	1	1	1
Ricerca documentazior	Pianificazione e organizzazione attività	0	0	1	0	2	1	0	1	2	0	0	1	0
Ricerca documentazior	Promemoria attività	0	0	1	0	2	1	0	1	2	0	2	1	0
Ricerca documentazior	Personalizzazione interfaccia e struttura	1	1	2	1	1	2	0	1	2	1	1	2	0
Ricerca documentazior	Interfaccia user-friendly	2	2	1	2	1	1	1	2	2	1	1	1	0
Ricerca documentazior	Sistema di ranking	0	0	0	0	0	0	0	0	2	0	0	0	0
		8	8	12	10	14	13	8	11	18	7	10	14	6
	FUNZIONI SOCIAL													
Fruibilità	Creazione gruppi di lavoro	1	1	2	2	2	1	0	2	2	2	2	2	0
Fruibilità	Condivisione di Gruppo BDR dei documenti	0	1	2	2	2	1	2	1	0	2	0	0	2
Fruibilità	Condivisione locale (Bassano) dei documenti	2	0	2	2	2	1	2	1	2	2	2	1	2
Fruibilità	Lavoro contemporaneo sullo stesso documento	1	1	0	0	1	0	0	1	2	1	1	2	2
Fruibilità	Chat istantanea	0	0	0	0	0	1	0	1	2	2	0	0	0
		4	3	6	6	7	4	4	6	8	9	5	5	6
	SICUREZZA E ATTENDIBILITA'													
Fruibilità	Memoria operazioni (versioni)	1	0	2	2	1	0	2	0	2	0	2	1	2
Fruibilità	Protezione dei file	2	0	2	2	2	2	2	0	2	0	2	1	2
Fruibilità	Possibilità annullamento/recupero operazioni	1	0	2	2	1	0	2	0	2	0	1	2	2
Fruibilità	Validazione documento pre-pubblicazione	0	0	1	1	2	0	2	0	2	0	2	0	2
		4	0	7	7	6	2	8	0	8	0	7	4	8
	PORTABILITA'													
Fruibilità	Installazione su dispositivi mobile	0	0	1	0	1	2	0	1	2	2	0	2	0
	SOMMATORIA TOTALE	19	14	32	29	34	25	25	21	41	22	27	28	22

Then we calculated the total score for each software to have an overall idea of which are the more or less complete software at first sight. Moreover, we calculated the average score for every system in relation to the function considered:

Ricerca documentazione	4	4	6	4	9	8	3	5	12	2	5	8	1
Fruibilità	12	7	20	19	19	13	17	13	24	16	17	17	18
Sicurezza	4	0	7	7	6	2	8	0	8	0	7	4	8
Social	4	3	6	6	7	4	4	6	8	9	5	5	8
Tempistiche di chiusura	0	0	2	0	4	2	0	2	4	0	2	2	0
Cronologia documento	4	0	6	6	4	2	6	0	6	0	5	4	8
Portabilità	2	2	2	2	2	3	1	3	4	3	1	3	0
Sistema di ranking	0	0	0	0	0	0	0	0	2	0	0	0	0

- Documentation search;
- Usability;
- Safety;
- Social;
- Closure timing;
- Document history;
- Portability;
- Ranking system;

After that, we were able to identify the pro and cons of every software in each precise function or parameter considered, with an overview of which of these systems cover more things and tasks. All these marks provided us the solutions and responses to the users' needs.

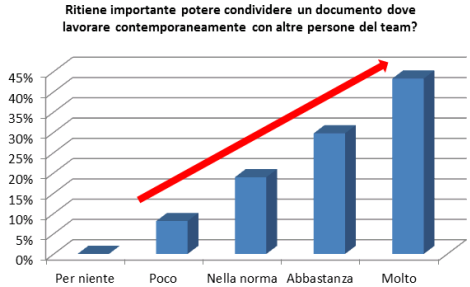
The third part was to compare every single need emerged from the survey, trying to find the best solution for every specific necessity in the benchmark table. Hence, we were able to identify the more appropriate software for each precise exigency, with the aim to teach to users the right manner to do their activities with the software and how to use them in daily tasks. Secondly, we pointed out the lacks of every system, and the strength points. Last but not least, we sought what the currently software don't satisfied, giving a feedback to the IT department of what could be improved in the future.

4.4. Results

From the survey of needs it emerged that several activities should necessarily be improved, others are not so urgent but could be enhanced and, finally, two are not important or well understood from the users (in the "users' needs analysis" chapter, we underlined the differences among activities, tracking a red line or arrow in the charts). Further, we saw that the speed of software in opening files and document doesn't influence the daily users' work and tasks.

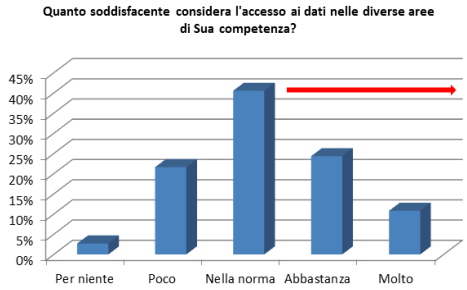
Let see the divisions in order of priority:

1) Necessary activities:
   - Document sharing between team members;
   - Have more "under control" the pending tasks;
   - Have stored the history of document.



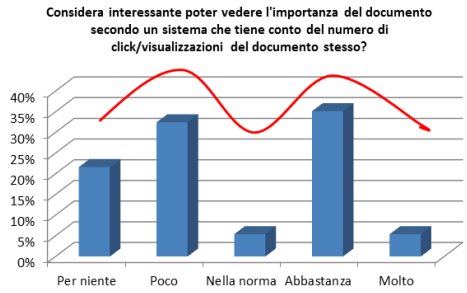
2) Activities for improvement:

- File and document search;
- Data access;
- Used templates;
- Used software.



3) Not important or not understood activities:

- Tablet use inside the company;
- Software with ranking features and ability.



With the two open questions, we collected these issues/suggestions:

- Files and documents are dispersed in the Window platform, maybe it is better to collect them all inside Teamcenter database;
- There is an information dispersion among different departments;
- IBM Lotus QuickR needs easier permissions and instructions;
- We could integrate Movex inside Teamcenter;
- To implement filter in Moves (e.g. suppliers, prizes, etc.);
- Software considered unreliable:

  Teamcenter by 8 users;

  Lotus Notes by 4 users;

  Lotus QuickR by 3 users.

4.5. Best practices and our suggestions

From the needs' analysis and the benchmark table, we compared needs and marks of the all functions to advice the user about which could be the best way to do his daily tasks. We wrote the following points list:

- Social functions are well satisfied by IBM Connections, NPCP, WebEx, QuickR, IBM Sametime;

- Software that allow to control timing and closure of activities are mostly IBM Connections, NPCP, QuickR;
- We can find previous versions of files and documents only in IBM Connection, NPCP, QuickR and Teamcenter;
- Documents research is easier in IBM Connection, NPCP and Lotus Notes;
- Documents and files are more reliable and safe in IBM Connection, NPCP, QuickR and Teamcenter;
- Introduction, completion and standardization of templates with the implementation of the new NPCP 2.0 (New Product Creation Process);
- The speed of software doesn't influence the daily users work.

In addition to this, we arrived to several conclusions regarding the IT Systems.

First, it is clear that File System Bassano and specially File System Remeha are obsolete, indeed they have the lowest score in the benchmark table and they don't cover many function of users' work. Further, File System Remeha has the grave lack of a backup function, and then the safety of data is at risk in every moment in addition to the low level of information reliability. Users, as we understood, find easy the working with File Systems database and it isn't simple to replace them with others; but we identified in Lotus QuickR a valid solution, mostly through the installation of the QuickR Connections application, that enable the possibility to have a framework similar to File Systems but with many better aspects like such as safety, reliability, social functions, etc.

Another evidence is the predominance of IBM Connections, NPCP and IBM Lotus QuickR in almost all main functions requested by the users, so we strongly recommended to start using them for the more possibly activities changing from older software to these newer and with a different conception of working in an social community. Indeed a new point of view of the three software above is that the focus is on the document, so a team is able to work in the same space with the same document and the same information, decreasing the concentration on the single person but vice versa increasing that on document and community of people.

Even if more than one user affirmed in the survey that Teamcenter is slow and sometimes unreliable, we know that is essential for employees because it offers many tools that other systems don't provides, mostly regarding drawings and CAD activities. One noticeable thing is that, as IBM Connections, it has the maximum level of safety and reliability of the information, in fact there are approval processes, backup and data history available.

If we consider only the social functions, the more complete is Cisco WebEx, because it is thought right to provide meetings, video-conferences, chats, etc., and its user-friendly interface allows to use it easily even on mobile devices. As we know, not all tasks are covered but only specific activities; however, in this growing of global economy it will always assume a more needful position inside the companies and the communication systems. Another useful social system is IBM Sametime, currently underestimated and not used enough, even if it has a lot of function inside that should be used to improve the speed of communication among colleagues. Furthermore, it can be completely integrated in the other platforms like IBM Lotus Notes and IBM Connections.

Considering Web Quality, even if it has many functions that could cover enough tasks of users, the not user-friendly interface in addition to the lack of use in the R&D department brings to avoid using it to archive document and work with.

Finally, we want to talk about pro and cons of IBM Connections. It obviously is the future both for social functions and for usability or simplicity of the interface, but it not all. One of the best improvement is the ranking algorithm inside this software, that allows to consider the importance of documents, analyzing the interaction of all interested users with the document considered. This means that one employee could see firstly the things where colleagues are working more frequently: he could see the last variations or simply the documents more clicked from others. It is a new way to work, where the work place starts to become social, like , for instance, Facebook or others, but in a manner where employees can save time, energy and stress. From the survey this point of ranking isn’t been perceived by users, but in our opinion the way with which social networks have invaded the whole world and all people, will be the new path that big companies have to do to enhance the work environment. Simultaneously it has a big constraint: currently it will be implemented only in Bassano department, so this limits its functions in a local place, but nothing forbid to use it for all Group in a near future.

5. Activity two: Standardization of the directories structure and templates inside BDR Thermea Group

5.1 The needs and why of standardization in multinational companies

Lately, the overwhelming majority of global organizations have undertook the path of standardization in processes, products and businesses. The need of standardizations is due to the growth of the local and small business over years, where firms has seen their progressive expansion in different countries or continents, absorbing resident minor industries or building completely new productive dislocations , and hence hiring people living in those places. This expansion carries several issues related to the different cultures, traditions of work, principles of quality and communications manners. These, could be dangerous bottlenecks in the global management and success of the industry, bringing to the principle of defining a common way of work and communication, with agreed procedures, principles and standards, ensuring everywhere the continuous and shared vision of the company towards the global business success.

A general definition says that “Standardization is a framework of agreements to which all relevant parties in an industry or organization must adhere to ensure that all processes associated with the creation of a good or performance of a service are performed within set guidelines. This is done to ensure the end product has consistent quality and that any conclusions made are comparable with all other equivalent items in the same class”. It encourages making for conformity to some generally agreed method, principles and norms of application or usage, serving a regulatory function and reducing variations. This development of common specifications for materials, products, processes, practices, performances or other things involved in the organization, allows many improvements in productivity, cooperation, accountability and interoperability essential to be able to compare in nowadays markets.

Focusing on project management rather than standardization in products or in other aspects of the business, it means establishing standard procedures and practices for optimizing resources, time, costs and efforts across different plants and departments all over the world, sharing the same basic rules and principles, implementing and providing to everyone involved in projects a set of guidelines, documents, methods or specifications that give the opportunity to manage, collaborate and communicate in effective and efficient ways in every place people are situated and work.

Obviously, this process needs years to become operational and worthwhile in every single area of the company. However, with little steps and continuous initiatives it is able to provide immense advantages for the firm, and it must be promoted by all employees involved in; furthermore, there is no end in this process of improvement toward standardization, and hence, activities have to be undertaken every time it is necessary or there is an opportunity to work better.

Standardization is an essential step when a multinational company intend to deal with projects in which international teams are involved, because they must follow same criteria, methods and specifications in order to avoid misconceptions and unnecessary endeavours in their daily work and activities. In other words, they have to speak the same "language" (language that means the whole set of goals, strategies, principles, guidelines, best practices and go on).

5.2 Scope of the activity

The activity considered regards the standardization of the directories' structure and the set of template used in the entire life cycle of projects managed by international teams in BDR Thermea Group.

Indeed, in the last years, many more project have started using members and resources from different plants spread in various countries, pointing out issues or things to be improved in order to increase the connections and cooperation among employees involved in that change, from local to global. Every establishment, in fact, was used to manage projects in an own way, using a set of documents and templates, storing data and information in different manners and software, with an effective and efficient modality for its projects. All that didn't present troubles until project have become global, involving people from different countries and with various working approaches and habits. During years many things were done towards this goal of building the entire set of tools and methods to enable international teams working easily and efficiently, one of them is surely the NPCP that provides a standard group of procedures, features and tools to manage every kind of projects from every country and department around the Group BDR Thermea. However, following also the lean pillar of continuous improvement, it emerged the possibility to enhance the way in which team members store and manage project's information, and also the series of templates and document used in the project's life cycle, with the target to provide a common solution agreed from all the establishments and departments, both from a local and a global point of view. Hence, summarizing the needs perceived by teams, we can list these main points:

- Increase the interconnections among different Research and Development (R&D) Competence Centres spread in the Group, between R&D and the other departments in the same company and in different company, or among different departments (same company or different companies) with the same target or project;
- Have only one place where to save the information for the same project, having a working place for the NPCP database;
- Avoid project's data duplication or dispersion;
- Save time and efforts in project's documentation research with a common organization of the main directories;
- Having a set of common templates used for the project development;
- Reinforce international teams.

Passing to the expected results of the study, the initial scopes were:

- Build the common framework and organization of the folders' root for every kind of project;
- Store and manage projects' data and documentation in a common and shared room;
- Standardize and use the same approach to save and consult information;
- Build the set of templates and documents needed for every sort of projects.

After these actions, everyone in the BDR Thermea Group should be able to work more efficiently and easily in his/her tasks involved in the project, enabling an simpler communication and cooperation with others, wasting less time in data research or storing, starting using the fundamental concept in these years of "team members work together around a document or activity".

5.3 Process to reach a common agreement

The general meaning of word agreement, found in generic dictionaries, is: "the situation in which people have the same opinion, or in which they approve or accept something". Reflecting this thing in a multinational organization, it means that all people interested or involved in changing something have to agree and to approve what is proposed. Hence, mostly in complex and international decisions, there needs a complete process to reach a common solution starting with a common purpose or need. For our analysis, there were several steps to gain the final consensus

from all interested parts, following every level of assessment in the Group hierarchy and involving all key users that have to work daily with the possible changes proposed.

First of all, the idea was fully presented and explained to the Chief of the Project Managers around the Group, who approved the improvement proposal and suggested his personal advice to gain a good result. As well, it was illustrated to the entire list of key users to work with towards the target, and to a reference person to inform during the development of the activity. Secondly, there was an interview stage to present the task to every single key user explaining the process thought to achieve a successful result, searching their approvals and interests, gathering data needed to conduct this project and collecting also their personal trouble or opinions about. After that, an analysis of data collected and a confront with the reference person allowed to draw up a proposal to be presented to the interviewed people stimulating other ideas and thoughts towards the final solution, to be shown to the Chief of Project Managers and to be officialised and implemented inside the Group's practices and rules.

5.4 Interviews

After the assessment of the activity proposed and the approval by the Senior Manager, the first step were the interviews of key users of all R&D Competence Centre around the Group. In Bassano, we scheduled a plan to interviewing every key user individually, explaining the purpose, the process, the reasons for this effort and change, and we asked their collaboration to provide essential data needed to conduct the analysis, demanding also personal opinions, comments or issues related to this field of management. Interviews were done using interactive video-calls through the WebEx software, every other communication through IBM Lotus Notes with E-mails.

These questions were asked to every interviewed:

1. Take a screenshot of the root organization of your folders for projects in File System.
2. Which folders (among all) do you use more?
3. What do you put inside the projects' folders?
4. Personal opinions/suggestions/issues regarding this purpose?

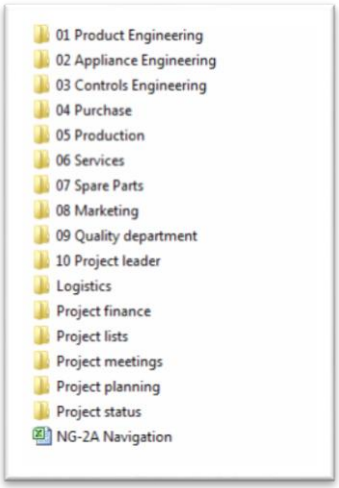
This was the schedule of interviews:

Day	Time	Key Users/CCs Centre
18/01/2016	14:00 – 15:00	De Dietrich
18/01/2016	15:00 – 16:00	Baxi UK
18/01/2016	16:00 – 17:00	Chappee
18/01/2016	17:00 – 18:00	Apeldoorn
20/01/2016	09:00 – 10:00	Heatrae Sadia
20/01/2016	10:00 – 11:00	Senertec
20/01/2016	11:00 – 12:00	Broetje
20/01/2016	14:00 – 15:00	Baxi Innotech
20/01/2016	15:00 – 16:00	Apeldoorn Controls
20/01/2016	16:00 – 17:00	Baxi Spain
20/01/2016	17:00 – 18:00	Bassano

At the end of the interviews, we collected the entire set of current directories' structures used by every Competence Centre, the bunch of opinions/issues/suggestions from the Key users, and another important thing: everyone felt the need for an improvement related that area.

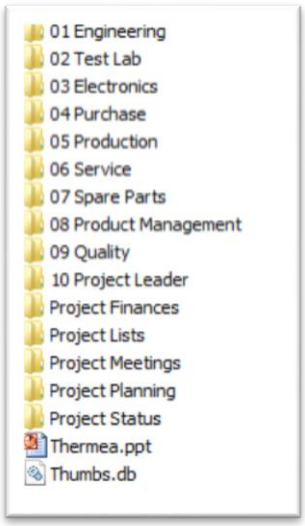
These are the folders' structures currently in use and the relative thought for every CC:

- Apeldoorn



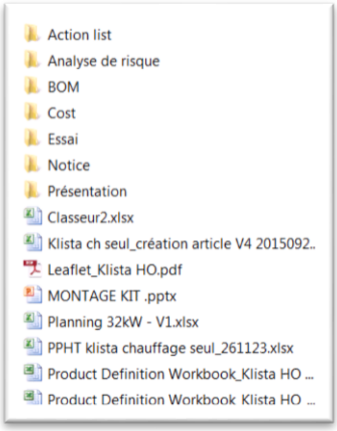
- Folders structure used for all projects;
- Logic dynamic to find documents;
- Too many folders;
- Less detail in the standard project folder combined with the freedom to add folders only on a deeper level, will give an improvement.

- De Dietrich



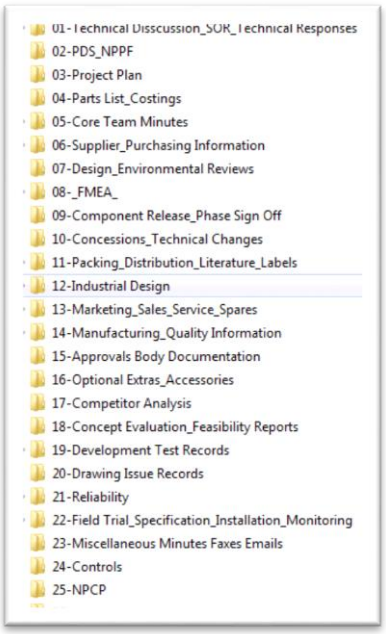
  - The names of folders are clear and easy to address;
  - Reducing the number of folders;
  - Folders more used by Project Manager are Project Finance /Lists/Meetings/Planning/Status

- Chappee



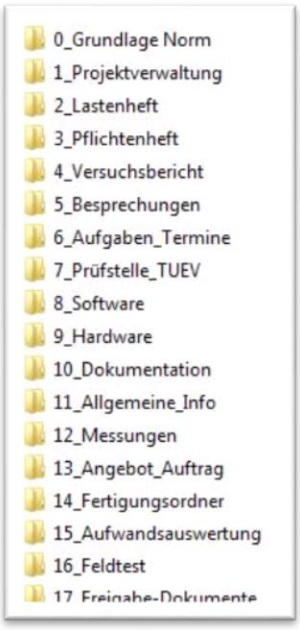
  - No standard structure present;
  - Different departments use different databases and communication runs mostly with e-mails;
  - Action list folder the most used

- Baxi United Kindom



  - Understanding how to manage closed projects (if to leave them inside QuickR or to move them inside a local database) and how to manage the accesses and permissions to modify documentations inside QuickR after the closure of project

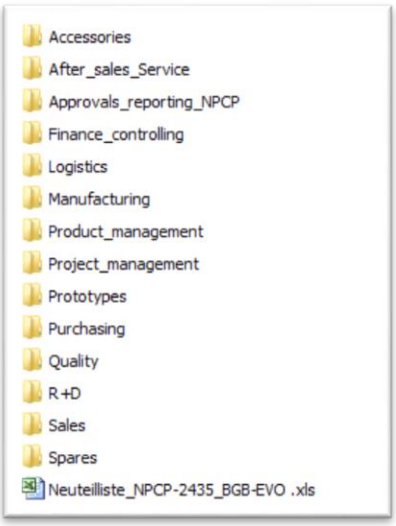
- Senertec



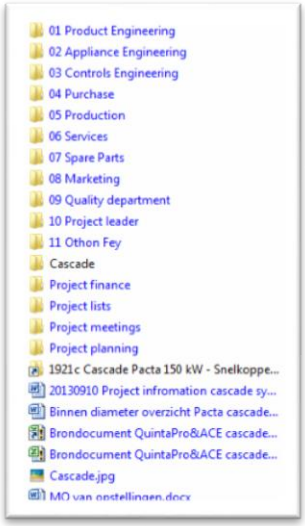
- Only R&D uses the following structure;
- Easy way to find documentation inside folders;
- Little difficulties in the beginning to understand the structure e find information.

- Broetje

- Users sometimes store and save information in their own PC so information are not always available immediately;
- Who has the control of permissions in QuickR? Define also a structure for the owners/accountable to give the accesses/permissions/restrictions for folders in QuickR

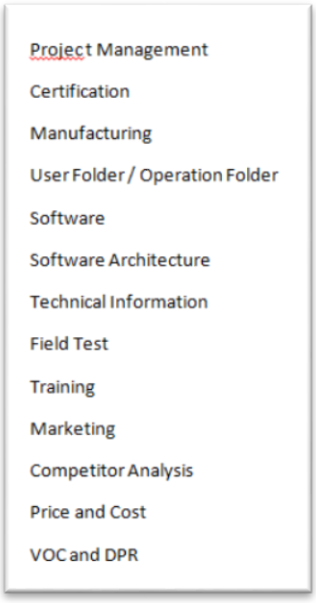


- Apeldoorn Controls



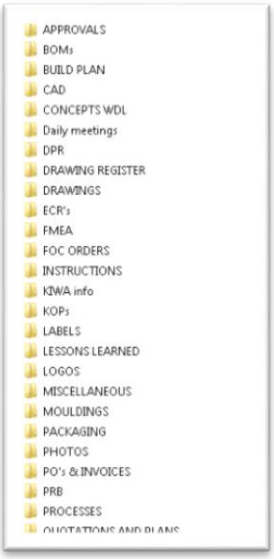
- The structure is similar to Apeldoorn and it works well

- Baxi Innotech



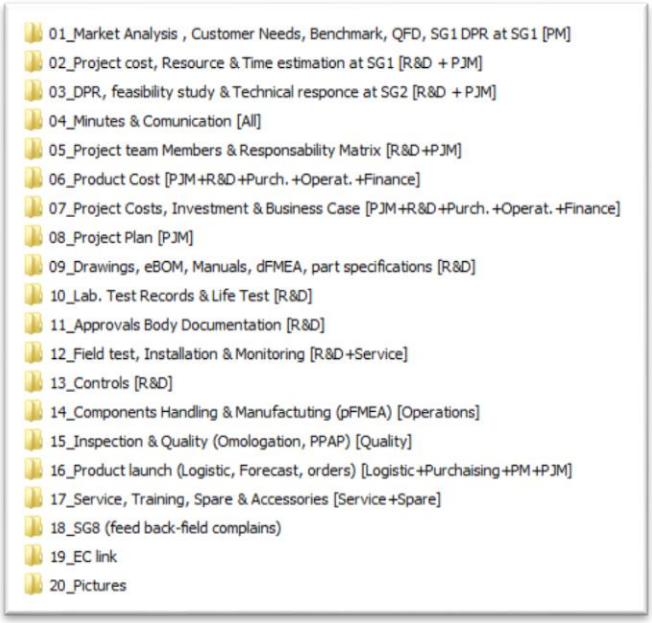
    - Maybe the current structure is not complete
    - It is better to use an structure focused on activities rather than one of function, so people from different departments are able to work on the same activity of project

- Heatrae Sadia



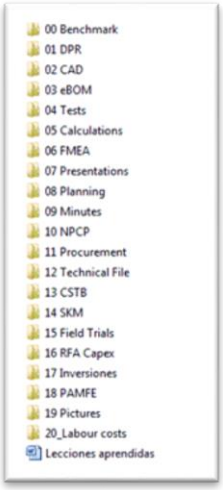
    - It is good to have a shared place with the same structure;
    - Build a simple structure but with (at least) two fixed levels and control the permissions

- Bassano



    - First level fixed;
    - Why not use NPCP as repositoring tool for projects' files;
    - It needs a software for interaction between departments;
    - Understanding if it is better to save projects' files for STGs or macro areas

- Baxi Spain

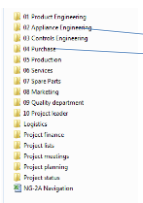
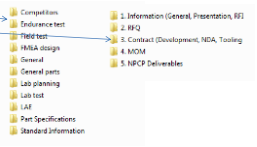
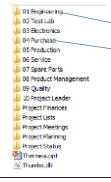
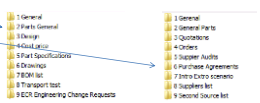


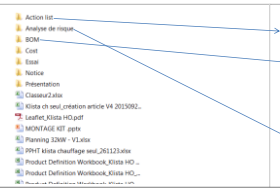
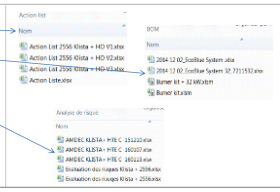
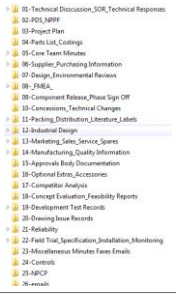
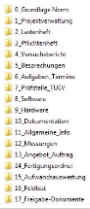
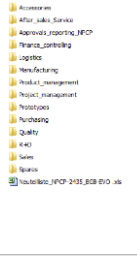
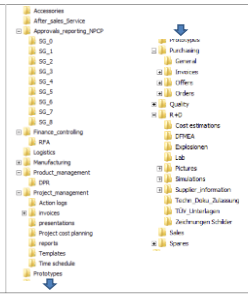
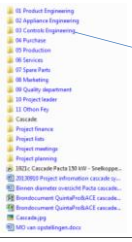
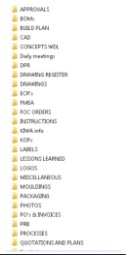
- Only first level is fixed;
- There isn't files' duplication because users know the structure and they can find easily documents;
- It needs controls over pubblications and modifications of files by users;
- QuickR is a bit slow there

Whit all these informations, we were able to build a chart in Microsoft Excel (visible in the next page) analysing, comparing and evaluating the all ways in which Comperence Centre are working and addressing the advantages and drawbacks of every structure from our point of view.

5.5 Analysis

Once we had collected the needed data, we started working on Excel, reasoning on which could be the best solution between all these sorts of structures. Obviously, every structure is peculiar and tailored on the need of every respective establishment, so the global solution surely will have some compromises, but the main thing is that it should incorporate all positive aspects seen in the current directories' roots.

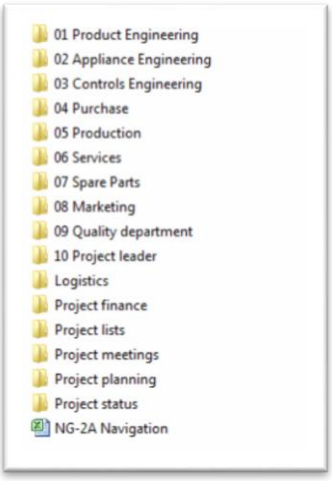
FILE SYSTEM PROJECTS ANALYSIS						
Person/Company	Date and time	Main comments and suggestion	File System Projects Root - 1° Level	File System Projects - 2° Level (example)	Advantage	Drawback
Klaas Ophoff (Apeldoorn)	18/01/2016 11:00 - 11:30	- Folders structure used for all projects; - Logic dynamic to find documents; - Too many folders; Less detail in the standard project folder combined with the freedom to add folders only on a deeper level, will give an improvement.			- Division for function - Presence of all departments involved in projects; - Clear divisions; - Projects' vision from a complete point of view; - All people can find documentation among departments - One database for all departments	- Many levels; - Less freedom in the first levels; - Many folders; - Complexity; - Access's permissions needed
Sonia Bilger (De Dietrich)	18/01/2016 14:00 - 14:30	- The names of folders are clear and easy to address; - reducing the number of folders; - Folders more used by Project Manager: Project Finance/Lists/Meetings/Planning/Status			- Division for function - Presence of all departments involved in projects; - Clear divisions; - Projects' vision from a complete point of view; - All people can find documentation among departments - One database for the entire company;	- Many levels; - Less freedom in the first levels - Many folders - Complexity; - Access's permissions needed

Aline Andre (Chappee)	18/01/2016 16:00 - 16:30	- No standars structure present; - Different departments use different databases and communication runs mostly with e-mails; - Action list folder the most used			- More freedom to add folders; - Less levels	- Only R&D documents; - More databases among departments - Not very clear way to find documents for new users - Less organization and structure for new users
Paul Sculthorpe (Baxi UK)	18/01/2016 17:00 - 17:30	- Understanding how to manage closed projects (if to leave them inside QuickR or to move them inside a local database) and how to manage the accesses and permissions to modify documentations inside QuickR after the closure of projects			- All folders are visible; - All departments are present; - Less levels; - One database for all departments;	- Many directories; - Information's dispersion among the directories; - Not clear division among departments; - Not immediately understandble for new users
Michael Zehe (Senertec)	20/01/2016 10:00 - 10:30	- Only R&D uses the following structure; - easy way to find documentation inside folders; - little difficulties in the beginning to understand the structure e find information			- Clear folders' division; - Easy understanding for R&D users; - Less levels; - Easy way to find information	- Only R&D documents; - Not a completed view of the entire project - More databases among departments
Rainer Witting (Broetje)	20/01/2016 11:00 - 11:30	- Users sometimes store and save information in their own PC so information are not always available immediately; - who has the control of permissions in QuickR? Define also a structure for the owners/accontables to give the accesses/permissions/restrictio ns for folders in QuickR			- Clear folders' division; - Presence of all team members involved in the project; - Presence of Stage Gates; - Relatively easy way to find information; - Complete vision of the project; - One database for all departments; - Officialized documentation for each STG	- More levels; - Many folders; - Possible data duplication; - Less flexibility; - Not all directories are for work, but someones are for a repositoring use; - Access permissions needed
Riemer Hoeskra (Remeha)	20/01/2016 13:30 - 14:00	- The structure is similar to Apeldoorn and it works well			- Presence of all departments involved in projects; - Clear divisions among departments' folders; - Projects' vision from a complete point of view; - All people can find documentation among departments - One database for the entire company	- Many levels; - Less freedom in the first levels; - Many folders; - Complexity; - Access's permissions needed
Philipp Klose	20/01/2016 15:00 - 15:30	- maybe the current structure is not complete - It is better to use an structure focused on activities rather than one of function, so people from different departments are able to work on the same activity of project	Project Management Certification Manufacturing User Folder / Operation Folder Software Software Architecture Technical Information Field Test Training Marketing Competitor Analysis Price and Cost VOC and DPR			
Matthew Eckles (Heatrae Sadia)	20/01/2016 16:00 - 17:30	- It is good to have a shared place with the same structure; - build a simple structure but with (at least) two fixed levels and control the permissions			- All folders are visible; - Clear contents inside the directories - Less levels - Clear distinction among directories	- Only R&D documents; - Not a completed view of the entire project - More databases among departments - Many folders - SG's are not visible

Tiziano Marzaro (Bassano)	22/01/2016 14:00 - 14:30	- first level fixed; - why not use NPCP as repositoring tool for projects' files; - it needs a software for interaction between departments; - understanding if it is better to save projects' files for STGs or macro areas	01_Market Analysis , Customer Needs, Benchmark, QFD, SG1 DPR at SG1 [PM] 02_Project cost, Resource & Time estimation at SG1 [R&D + PJM] 03_DPR, feasibility study & Technical response at SG2 [R&D + PJM] 04_Minutes & Comunication [All] 05_Project team Members & Responsability Matrix [R&D +PJM] 06_Product Cost [PJM+R&D+Purch. +Operat. +Finance] 07_Project Costs, Investment & Business Case [PJM+R&D+Purch. +Operat. +Finance] 08_Project Plan [PJM] 09_Drawings, eBOM, Manuals, dFMEA, part specificatons [R&D] 10_Lab. Test Records & Life Test [R&D] 11_Approvals Body Documentation [R&D] 12_Field test, Installation & Monitoring [R&D +Service] 13_Controls [R&D] 14_Components Handling & Manufacturing (pFMEA) [Operations] 15_Inspection & Quality (Omologation, PPAP) [Quality] 16_Product launch (Logistic, Forecast, orders) [Logistic +Purchasing +PM +PJM] 17_Service, Training, Spare & Accessories [Service +Spare] 18_SGB (feed back-field complains) 19_EC link 20_Pictures	Meeting & Webex Reports - Presentation PRES & Board presentation Competitor analisys DPR & Technical Response Input Initial Project amounts Stagegate 2.xls	- more freedom - macro areas - only first level fixed - view of the entire project	-only R&D users can access
Oscar Mogro (Baxi Spain)	22/01/2016 10:00 - 10:30	- The structure is similar to Apeldoorn; - only first level is fixed; - there isn't files' duplication because users know the structure and they can find easily documents; - it needs controls over pubblications and modifications of files by users; - quickR is a bit slow there	00 Benchmark 01 DPR 02 CAD 03 eBOM 04 Tests 05 Calculations 06 FMEA 07 Presentations 08 Planning 09 Minutes 10 NPCP 11 Procurement 12 Technical File 13 CSTB 14 SKM 15 Field Trials 16 RFA Capex 17 Inversiones 18 PAMFE 19 Pictures 20_Labour costs Lecciones aprendidas		- less level - division for macro-areas -	only R&D users have access

What emerged is that there are three main kinds of folders' structure among all R&D Competence Centre and more or less every establishment tends to use one of these three rather than an equal mixture: folders' division by function, folders' division by macro-activities and, at last, folders' division by stage gates. Every one of these three ways has some pro and some cons, visible below:

1. **Division by Function**



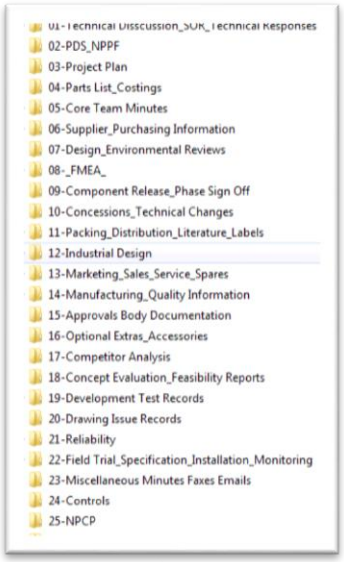
Advantages:

- Presence of all departments involved in projects;
- Clear divisions by function;
- All people can find documentation among departments;
- Easy identification of own activities into the directories;
- …

Drawbacks:

- The structure is for functions and not for the overall process;
- Many levels;
- Complexity;
- Control of permissions and accesses;
- Documents duplication;
- …

2. Division by Macro-Activities



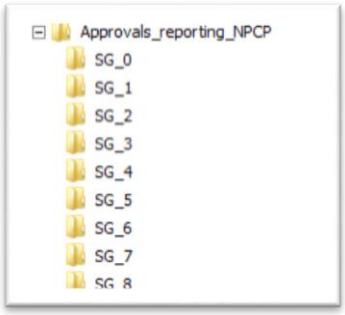
Advantages:

- Division for macro activities → objectives are clearer;
- Focus on the document rather than the function or department;
- All folders are visible;
- Less levels;
- …

Drawbacks:

- Many directories;
- Not clear division among departments;
- Not immediately understandable for new users;
- …

3. Division by stage gates



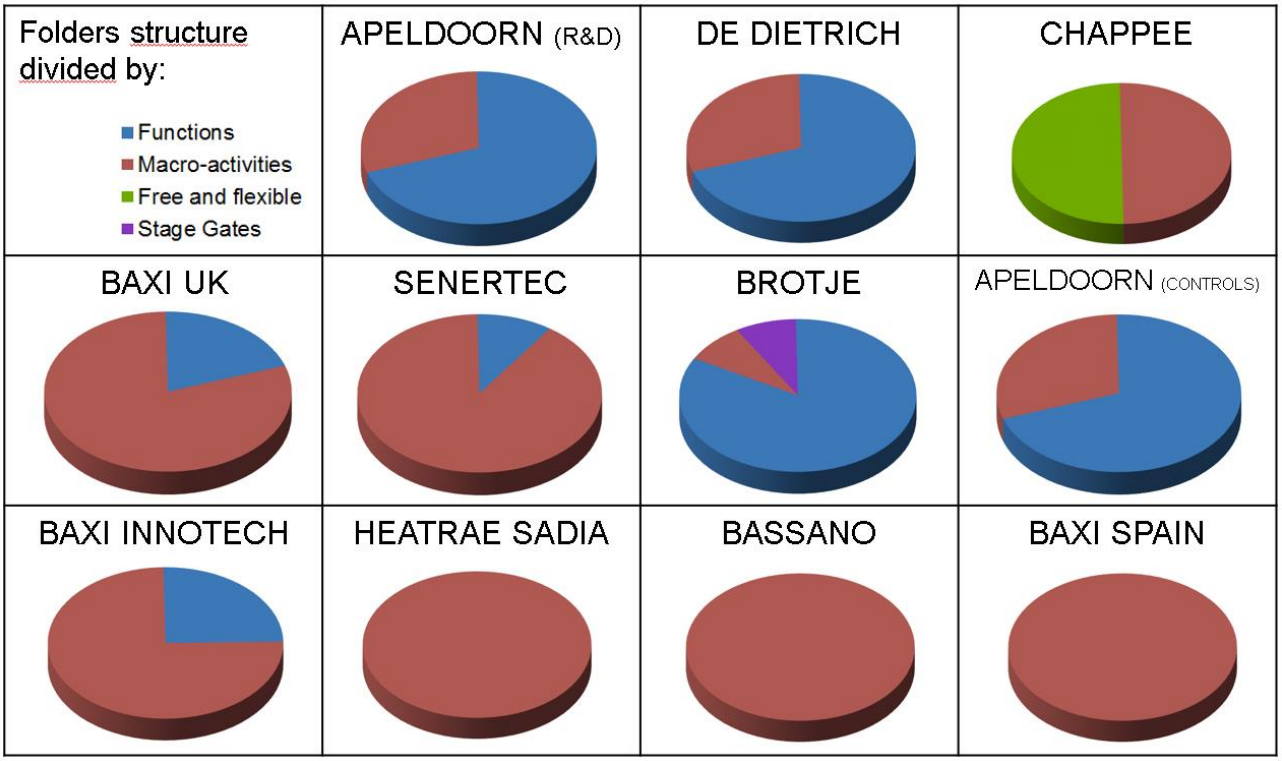
Advantages:

- Division for stage;
- Clear divisions in the first level;
- Less folders in the first level;
- The directories structure follows the NPCP;
- Based on temporary progression of projects;
- …

Drawbacks:

- Many folders in secondary levels;
- Information's dispersion among the directories;
- Not clear division among departments;
- Risk of data and documents duplication;
- Possible redundant structure of folders in the second level;
- Currently used only for final documents repository by only one company;
- …

Understood this division, we came back counting analytically the percentage of directories for function, macro-activities and stage gates there are in the structures of every Competence Centre. This was possible addressing every single directory of the structures to the appropriate division (function, macro-activity, stage gate) and then counting how many folders there are for each division divided with the total number of folders present in the structure considered. The table below represents the global situation:



As we can see in the table, there are a clear predominance of structures caracterised by a macro-activities division, a minorance with a function approach, and very few with other overtures such as stage gates or free and flexible. Using numbers to be objective, six out of eleven Competence Centers are using a macro-activity approach, while four out of eleven use a function division, and only two has implemented an attempt toward the stage gates or free and flexible structures even if it is only a part of the entire frame.

Speaking with interviewers, it is also emerged that many Competence Centres don't completely share their Fyle System with other local departments, pointing out how much important could be the opportunity to have a shared software and place where every one involved in the project is able to find data and information needed to proceed with his activities, withouth wasting time asking every time the help of others throught e-mails, calls or other sort of communication.

Moreover, with a clear and stable structure shared with every employee and every department, all people could start working with the same approach, using a common set of templates stored in a shared and standardized set of directories. This key point is even enhanced nowadays by the need to work in an international environment, facing and increasing interactions between Competence Centres and local or global departments.

But the main consideration that we understood, keeping in mind also the New Product Creation Process used globally by the Group, was this: the NPCP 2.0 process requires to work in team and around specific documents, for this reason working in a functional way gives at the team less visibility of the target and, hence, the best approach seen in the structures analyzed is the macro-activity way, indicating a clear path to develop the final structure.

After showing it to the Chief of Project Managers and his agreement with our consideration, we started thinking and building a new proposal for the directories' root, based on a macro-activities approach and following the pillars of NPCP. First of all, having all data regarding the current structures, we consulted the NPCP process charts and tables with the target to understand how it could be possible to create a folders' frame as near as possible to the process.

NPD - High Level Deliverables									
Stages / Work streams	Stage 0 Customer need	Stage 1 Product definition	Stage 2 Design concept	Stage 3 Design assessment	Stage 4 Design completion	Stage 5 Industrialisation	Stage 6 Validation	Stage 7 Launch	Stage 8 Post launch
Voice of the customer	Project rationale defined Customer leaflet available	VOC translated in high level requirements	Technical response on requirements given DPR agreed (handshake)	Customer feedback given on prototypes	Customer feedback given on final design				Customer feedback on actual product fed back to the project team
Business case	Project rationale defined	Business case made based on project estimations	Final business case defined	Business case updated based on current insights	Business case updated based on current insights	Business case updated based on current insights	Business case updated based on current insights	Business case updated based on current insights	Business case reviewed
Concept development			Physical concept is chosen and built	Product and component specifications made	Specifications updated and design frozen	Specifications updated (fine tuning)	Specifications updated (final)		
Product validation			Validation plan defined	Product risk analysis (DFMEA) executed	Technical field trial started	Field trial started	Products approvals completed Field trial feedback evaluated	Validation plan finalised	Quality figures reviewed
Supply chain management				Supplier long list made	Supplier selection completed	Logistics plan defined	ERP masterdata filled	Supply chain running according to forecast	
Industrialisation		Production location selected		Prototypes built Factory location lay out defined	Prototypes built Process risk analysis (PFMEA) executed	Products built with FOT components Manufacturing process audited	Products built with finetuned components Final manufacturing BOM made	0-series built Manufacturing process released	Series production running
Preparation for launch					Training plan made Logistics phase in/out plan made	Market launch plan made	Internal training carried out	Products released for delivery	
Project Coordination	Sponsor and Project Manager appointed	SG2 & SG7 dates estimated	Project team established Project targets set	Project reviewed against targets	Project reviewed against targets	Project reviewed against targets	Project reviewed against targets	Project reviewed against targets	Project reviewed against targets

How we can see in the table above, there are eight big categories in the process of development:

- Voice of the Customer;

- Business Case;
- Concept Development;
- Product Validation;
- Supply Chain Management;
- Industrialization;
- Preparation for Launch;
- Project Coordination.

Therefore, considering only the structures caracterized by a macro-activities approach, we collected all the directories present in every Competence Centre's first level of folders' root in an Excel chart, and then we addressed every single directory in one of the seven macro-areas of the NPCP 2.0 process, obtaining this result: all folders, even if they have differen names and from different Competence Centres, can be divided for what information and data they contain and grouped in those seven bigger categories, following closely the NPCP 2.0 structure.

Furthermore, we also considered which templates are suggested by NPCP 2.0 RACI Chart and which are present in international projects managed in Bassano, consulting also the Chiefs Responsible of other departments, drawing up a list of the essential templates and document needed to proceed with the project and used by team of people from different function but focused on the same activity.

With all these things and action, we were able to built the Excel table below, in which there are 5 columns: Competence Centre (CC), Directories in Specific CC, Categories in NPCP 2.0, Templates, Single or Team Use.

CC	Directories in specific CC	Categories in NPCP2.0	→	Templates	Single or Team Use
Preston	Tecnical Discussion-SOR-Technical Responses	Voice of Customer and DPR		Focus document / DPR template / Leaflet template	Team
Preston	Competitor Analysis	Voice of Customer and DPR		VOC	Single
Bassano	DPR, feasibility study & Technical response at SG2	Voice of Customer and DPR		Competitor Analysis	Single
Barcellona	Benchmark	Voice of Customer and DPR		Feedback customer	Single
Barcellona	DPR	Voice of Customer and DPR			
Senertec	2-Specification	Voice of Customer and DPR			
Innotech	VOC and DPR	Voice of Customer and DPR			
Innotech	Competitor Analysis	Voice of Customer and DPR			
Bassano	Market Analisys, Customer Needs, Benchmark, QFD, SG1 DPR at SG1	Voice of Customer and DPR			
Heatrae Sadia	LOGOS	Voice of Customer and DPR			
Heatrae Sadia	DPR	Voice of Customer and DPR			
Senertec	0-Standard Based	Voice of Customer and DPR			
Innotech	Marketing	Voice of Customer and DPR			
CC	Directories in specific CC	Categories in NPCP2.0	→	Templates	Single or Team Use
Preston	Supplier-Purchasing Information	Business Case		Business Case	Team
Preston	Parts List-Costings	Business Case		BOM (Product Cost)	Team
Bassano	Product Cost	Business Case			
Bassano	Project Cost, Investement & Business Case	Business Case			
Senertec	13-Order Quotation	Business Case			
Barcellona	RFA Capex	Business Case			
Senertec	15-Expenditure Review	Business Case			
Barcellona	Labour Costs	Business Case			
Bassano	Project cost, Resource & Time estimation at SG1	Business Case			
Innotech	Price and Cost	Business Case			
Heatrae Sadia	QUOTATIONS AND PLANS	Business Case			
Barcellona	Calculations	Business Case			

CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Innotech	Software	Concept Development	BOM	Team
Preston	Industrial Design	Concept Development	Ease to manufacturing	Team
Heatrae Sadia	BOMs	Concept Development	Manuals - CMS	Single
Bassano	Drawings, eBOM, Manuals, dFMEA, part specifications	Concept Development	CAD - Software/Hardware - Other doc. (labels, warranty card, ..) - Te	Single
Barcellona	CAD	Concept Development	Pictures	Single
Barcellona	eBOM	Concept Development		
Heatrae Sadia	CAD	Concept Development		
Heatrae Sadia	DRAWING REGISTER	Concept Development		
Heatrae Sadia	DRAWINGS	Concept Development		
Innotech	Technical Information	Concept Development		
Senertec	8-Software	Concept Development		
Innotech	Hardware	Concept Development		
Senertec	9-Hardware	Concept Development		
Preston	Design-Environmental Reviews	Concept Development		
Preston	Concessions-Technical Changes	Concept Development		
Heatrae Sadia	LABELS	Concept Development		
Bassano	Controls	Concept Development		
Heatrae Sadia	PHOTOS	Concept Development		
Barcellona	Pictures	Concept Development		
Bassano	Pictures	Concept Development		
Heatrae Sadia	MOULDINGS	Concept Development		
Preston	Controls	Concept Development		
Senertec	10-Documentation	Concept Development		
Preston	Drawing Issue Records	Concept Development		

CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Preston	FMEA	Product Validation	Test Plan (Lab Test Plan / Field Trial Plan / Reliability Plan / Field Trial issue log)	Team
Preston	Approvals Body Documentation	Product Validation	DFMEA template / QFD 1,5 / Risk Analysis	Team
Senertec	12-Measurements	Product Validation	CTQ list	Team
Preston	Field Trial-Specification-Installation-Monitoring	Product Validation	Notified body approval	Single
Bassano	Approvals Body Documentation	Product Validation		
Barcellona	Technical File	Product Validation		
Barcellona	FMEA	Product Validation		
Heatrae Sadia	APPROVALS	Product Validation		
Heatrae Sadia	KIWA info	Product Validation		
Barcellona	Field Trials	Product Validation		
Bassano	Field Test, Installation & Monitoring	Product Validation		
Barcellona	Tests	Product Validation		
Heatrae Sadia	FMEA	Product Validation		
Innotech	Field Test	Product Validation		
Senertec	16-Field Test	Product Validation		
Innotech	Certification	Product Validation		
Senertec	4-Test Report	Product Validation		
Preston	Concept Evaluation-Feasibility Reports	Product Validation		
Senertec	7-Testing_TUEV	Product Validation		
Preston	Development Test Records	Product Validation		
Bassano	Lab. Test Records & Life Test	Product Validation		
Preston	Reliability	Product Validation		
Barcellona	PAMFE	Product Validation		
Senertec	3-Certiification	Product Validation		

CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Heatrae Sadia	PACKAGING	Supply Chain management	Supplier selection matrix	Team
Bassano	Inspection & Quality (Omologation, PPAP)	Supply Chain management	Traking parts --> BOM	Team
Preston	Packing-Distribution-Literature-Labels	Supply Chain management	PPAP / Omologation reports	Team
Preston	Component Release-Phase Sign Off	Supply Chain management	Supplier Audit Plan	Single
Barcellona	Procurement	Supply Chain management	Logistic Profile (packagin definition: size and quantity)	Single
Heatrae Sadia	FOC ORDERS	Supply Chain management		
Heatrae Sadia	MISCELLANEOUS	Supply Chain management		

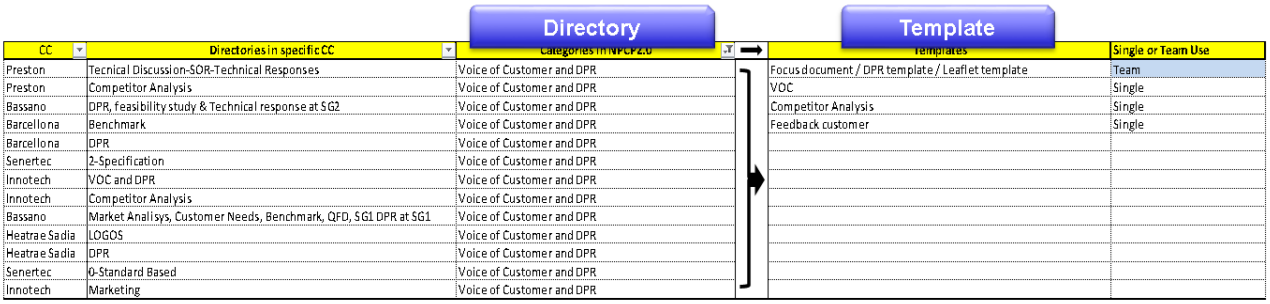
CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Preston	Manufacturing Quality Information	Industrialisation	PFMEA	Team
Senertec	14-Production Folder	Industrialisation	Control Plan (product control during the production process)	Team
Innotech	Manufacturing	Industrialisation		
Bassano	Components Handling & Manufacturing (pFMEA)	Industrialisation		
Heatrae Sadia	PROCESSES	Industrialisation		

CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Preston	Optional Extra-Accessories	Preparation for Launch	Spares - BOM	Team
Bassano	Product Launch (Logistic, Forecast, orders)	Preparation for Launch	Phase-in/Phase-out	Team
Bassano	Service, Training, Spare & Accessories	Preparation for Launch	Lesson learned	Team
Preston	Marketing-Sales-Service-Spares	Preparation for Launch	Engineering Changes	Team
Innotech	Training	Preparation for Launch	Forecast	Single
Bassano	SG8 (feed back-field complains)	Preparation for Launch	Service - Training	Single
Heatrae Sadia	LESSONS LEARNED	Preparation for Launch		
Heatrae Sadia	ECR's	Preparation for Launch		
Heatrae Sadia	INSTRUCTIONS	Preparation for Launch		
Bassano	EC link	Preparation for Launch		

CC	Directories in specific CC	Categories in NPCP2.0	Templates	Single or Team Use
Senertec	1-Project Management	Project Coordination	Plan	Team
Innotech	Project Management	Project Coordination	Action log	Team
Bassano	Project team Members & Responsability Matrix	Project Coordination	Minutes, Communication, SG Approval, presentations	Team
Preston	Core Team Minutes	Project Coordination		
Barcellona	Presentations	Project Coordination		
Senertec	6-Appointment_Task	Project Coordination		
Senertec	11-General Info	Project Coordination		
Innotech	User Folder/Operational Folder	Project Coordination		
Heatrae Sadia	PRB	Project Coordination		
Senertec	17-Release Document	Project Coordination		
Bassano	Minute & Communication	Project Coordination		
Barcellona	Minutes	Project Coordination		
Preston	Emails	Project Coordination		
Preston	NPCP	Project Coordination		
Preston	Miscellaneous Minutes Faxes Emails	Project Coordination		
Heatrae Sadia	BUILD PLAN	Project Coordination		
Heatrae Sadia	Daily Meetings	Project Coordination		
Senertec	5-Meetings	Project Coordination		
Bassano	Project Plan	Project Coordination		
Preston	Project Plan	Project Coordination		
Barcellona	Planning	Project Coordination		

5.6. Results

Once we gathered and grouped all contents in one place (Excel chart above), the best directories' structure was enough clear and immediate: all levels and folders of every Competence Centres' structure can be regrouped in only one level composed by eight directories, that are the Categories in NPCP 2.0. At the same time, we had the entire set of templates needed to manage the project from the beginning to the end, in which people from different department and location work together around the same document.

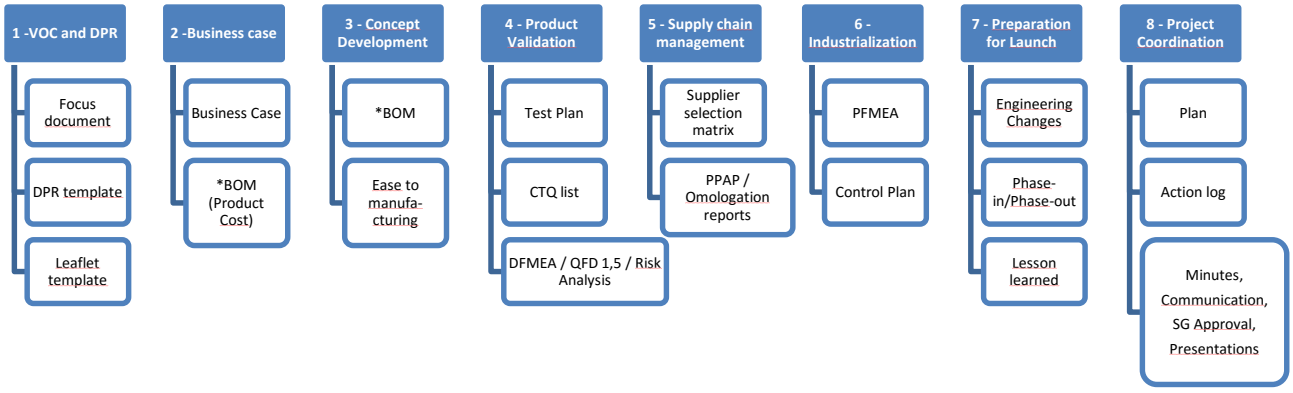


CC	Directories in specific CC	Categories in NPCP 2.0	Templates	Single or Team Use
Preston	Tecnical Discussion-SOR-Technical Responses	Voice of Customer and DPR	Focus document / DPR template / Leaflet template	Team
Preston	Competitor Analysis	Voice of Customer and DPR	VOC	Single
Bassano	DPR, feasibility study & Technical response at SG2	Voice of Customer and DPR	Competitor Analysis	Single
Barcellona	Benchmark	Voice of Customer and DPR	Feedback customer	Single
Barcellona	DPR	Voice of Customer and DPR		
Senertec	2-Specification	Voice of Customer and DPR		
Innotech	VOC and DPR	Voice of Customer and DPR		
Innotech	Competitor Analysis	Voice of Customer and DPR		
Bassano	Market Analisys, Customer Needs, Benchmark, QFD, SG1 DPR at SG1	Voice of Customer and DPR		
Heatrae Sadia	LOGOS	Voice of Customer and DPR		
Heatrae Sadia	DPR	Voice of Customer and DPR		
Senertec	0-Standard Based	Voice of Customer and DPR		
Innotech	Marketing	Voice of Customer and DPR		

This has been a radical and huge reduction either for the levels of the structures and for the number of folders in the first level, enabling team members working on a shared and standardized structure, with the same templates and instruction, starting learning a new way to consult and store data known by everyone inside the Group.

Regarding the templates, in the new structure will be insert only team templates. It means all those ones that are useful and essential from a team point of view, while specific documents for activities done by a specific and singular department or function, can be stored elsewhere because the team doesn't work with them but it needs only the final result, so it is a reading document and it has less importance for the team.

Summarizing, the solution that we proposed it is shown here:



As we can see, the first horizontal level represent the directories' root, and for each directory, there is a set of team templates fundamental to the project development.

Obviously, our idea was to give the possibility to insert other documents needed by the team for each specific project or that represent important data to be shared with other members. But, what we want to provide is a lean structure with few clear directories in the first fixed level where no one can add folders, and a complete set of standardized templates currently used in the Group projects.

5.7. Implementation and training

Found the best approach and structure of directories, defined the whole list of needed templates and documents to use, the last step is the implementation of those thing in a Group's software where everyone has access and can work with the project team. From our point of view in Bassano, a good tool to use for this goal could be IBM Lotus Quickr, that is present in every Competence Centre and allows many useful functions such as rooms, forums and wikies: but it has emerged that it needs to be set up better in some departments fixing several bugs mostly regarding the connection and speed in opening documents or files. Other globally shared platforms are NPCP, used to control and develop the entire project, and TeamCentre, currently used primarily for CAD drawing, so another analysis could reveal which software currently used could be the best to hosting the structure in an easy and efficient way or if it needs something completely new not yet used in the Group.

Last but not least, there will need a training session: if people doesn't understand and comprehend the deep requirement towards this change, probably they will not act encouraging this improvement. Hence, when the structure, platform, templates and rules will be completely defined, a short training meeting with all users could help people mastering the new approach, either to storage data and to find documents and to manage activities, probably stimulating new and future considerations regarding other improvements as well as lean management principles suggest.

6 Conclusion

As we explained in the introduction, the goal of the study was to explore the possibilities and improvements in the communication and information management during the entire project, and to propose a standardization of the directories' structure and templates used by the international teams during the whole development of projects. Further, these activities, needed by the company to continue the general improvement process implemented from many years, have allowed me to understand the overall process of product development from the idea to the launch to the market, comprehending more regard the project management pillars and methodologies in an international environment. Hence, I can surely say that my personal object to work and manage activities related to project management was fully achieved.

In addition to this, what was most important for the target of this thesis, was the success of the two activities, showing how lean management can be used to enhance project management and why the standardization and the communication are key points towards the success of projects. The first analysis showed how people could work better and more efficiently understanding deeper the tools that they have available, starting from their needs and developing a set of best practices regarding what they should use for their daily activities. Moreover, this first study helped the company in the choice to implement the new software Lotus IBM Connections, enabling employees working around a document or a problem as a social community featured by the same goal, following the ever more dominant role of social media also inside the work environment.

All that was done for a local improvement, even thought it could be replicated everywhere around the Group showing which tools could be enhanced, used more, implemented or phased out in the future.

Completely different but however linked with the communication inside the project, the second study involved the entire Group BDR Thermea, successfully tackling with the issue of standardization. We were able to manage a real need faced by all Research and Development Competence Centres, studying, analyzing and finally proposing a common and better way to manage data and activities done by local and international teams throughout projects' development. Thanks to a structured and analytical process of interviews, assessments and agreements by all stakeholders and senior managers, we build a directories' structure that follows three main pillars:

- Lean criteria of waste removal, value mapping, standardization;
- It is in line with the global process of new product development (NPCP 2.0);

- It has considered all main needs and issues reported by the key users.

The folders' root purposed was radically different and innovative, simplified and easily understood.

Moreover, we listed the complete set of templates essential for every project, which team members have to work with assuring a high level of interaction, communication and comparison around specific documents and guidelines during the whole project.

This last activity joined the huge set of tasks and improvement that the Group is undertaking toward an ever more efficient globalization of methods and processes in every part of the business, enabling to the organization to remain a leader in its field also in the next future, where competiveness and efficiency will be a must for all firms.

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